

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York.

Vol. XXII: No. 24.

New York, Thursday, December 12, 1878.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

The Ponsard Steel Furnace.

The Ponsard steel furnace, or "Forno-Convertisseur," as the inventor calls it, of which the two sections presented will give an accurate idea, is intended to occupy an intermediate position between the well-known apparatus of Bessemer and of Siemens. It has been pointed out by Mr. J. Sylvain Périssé, in a paper read before the Iron and Steel Institute at its Paris meeting, that the Bessemer process is limited in its application to a certain range of raw material, that its facility for the reworking of scrap is small, and that the plant is an expensive one and can only be worked to advantage if the production is large. On the other hand, the Siemens-Martin process is economical only when a large quantity of scrap enters into the manufacture of the steel; the replacement of the scrap and ends by ore being found to reach a limit by the deterioration of the hearth. From these statements it will be seen that there is an intermediate ground between that occupied by the two systems mentioned, and this it has been Ponsard's endeavor to cover. By referring to the illustrations, Figs. 1 and 2, its simple construction may be readily understood. A, shows a portion of the gas producer from which the products of incomplete combustion pass upward through the flue B, the opening of which lies directly below the end of the hot-air passage C. Both mixing, immediately enter above the hearth proper, D. The hot gases of combustion are then carried out through the flue E, by the chamber F, where any dust, &c., is deposited. As their temperature is very high, it may be suitably utilized for reheating scrap on the hearth G, and then only they serve for heating the air of combustion in the regenerator, the details of which are not shown in the illustrations, and for which we refer our readers to the issue of *The Iron Age* of Oct. 17. Besides this regenerator, the chief characteristic of the "Forno-Convertisseur" is the hearth proper, which, like the Per-

operations could be made every twenty-four hours, whereas, with the other apparatus used, the number of operations is as follows:

	Operations.
With Siemens-Martin furnaces.....	3 to 3
"Pernot's furnace.....	3 to 4
"Bessemer's converter (very variable).....	10 to 20

"The gas generator is fed with coal obtained at Mons, 500 pounds being consumed per hour. The material hitherto used has been Cumberland pig, containing 3 per cent. of silicon, old steel rails and iron puddled from

of them in correction of "office errors," it would be well if the Washington authorities would get the Supreme Court to pass upon the subject. The advantage of trade-marks to both manufacturers and the public is pretty well settled, and if Congress has not the constitutional power to protect them, the Constitution needs amendment in that particular as in some others.

The South Pacific Coast R. R. Tunnel.
—The San Jose Mercury says: A visit to the main tunnel of the South Pacific Coast

usually great quantities and threatened to overpower the workmen, the superintendent said to him, "Come down, John, till we get rid of this gas," to which the Chinaman replied, "All life, I come so soon as I fix him fast," and lifting his hammer he struck the nail which he was starting a forcible blow. The face of the steel hammer slipped from the head of the nail, causing a single spark to dart off, and in a second there was an explosion which hurled the unfortunate Mongolian a-bleeding and unconscious from his perch to the stones

the tool to the requirements; an American workman will as a rule use his brains, and make what you want without spoiling the whole by ridiculous blunders." The complaints, as above presented, form the basis of an argument in favor of giving apprentices a technical education combined with practical work.

A Famous Colonial Iron Works.

The old Sterling Iron Works in Orange county, N. Y., have been many times described, but not often by contemporaneous observers. The following is translated from a book published in Paris in 1801, and lately unearthed in that city by a Yonkers gentleman of antiquarian tastes. It was written by the Marquis de Creve-Cœur, who was in the French service in the old French and Indian war, and afterward traveled extensively in this country:

Hardly had we put our horses in the stable than Mr. Townsend, the proprietor, came to meet us with the politeness of a man of the world. Having learned that the object of our journey was to examine attentively his different works, he offered to show us all the details, and at once led us to his large furnace where the ore was melted and converted into pigs of 60 to 100 pounds weight. The blast was supplied by two immense wooden blowers, neither iron nor leather being used in their construction. This furnace, he said produced from 2000 to 2400 tons annually, three-fourths of which are converted into cannon and cannon balls, &c. From there we went to see the forge. Six large hammers were occupied in forging bar iron and anchors and various pieces used on vessels.

Lower down the stream (which afforded power to the works) was the foundry, with its reverberatory furnace (air furnace.) Here he called our attention to several ingenious machines destined for different uses. The models had been sent from iron of a recently discovered ore, which after two fusions acquired great fineness. With it he could do the lightest and most delicate work. "What a pity," he said, "that you did not come ten days sooner. I would have shown you, first, three new styles of plows, of which I have cast the largest pieces, and which, however, are no heavier than the old fashioned. Each one of them is provided with a kind of steel yard, so graduated that one can tell the power of the team and the resistance of the soil. Second, I would have shown you a portable mill for separating the grain from the chaff, followed by another machine by which all the ears in the field can be easily gathered without being obliged to cut the stalk at the foot, according to the old method."

From the foundry we went to see the furnaces where the iron is converted into steel. "It is not yet as good as the Swedes," said Mr. T., "but we approach it—a few years more of experience and we will arrive at perfection. The iron which comes from under my hammers has had for a long time a high reputation and sells for \$28 to \$30 per ton." After having passed two days in examining these divers works, and admiring the skill with which they were supplied with water, as well as the arrangements for furnishing the charcoal for the different furnaces, we parted from Mr. Townsend.

Saltpeter from Bolivia.—Bolivia is becoming a formidable rival to Peru and Chili in the production of nitrate of soda. With a coast-line not exceeding 100 miles in length, while the neighboring States of Chili and Peru between them monopolize nearly the whole of the Pacific Coast of South America, Bolivia exports more than 250,000 soles, or about 12,000 tons, of nitrate a month from the port of Antofagasta—a quantity equal to that now exported from Iquique in the same period. Greater facilities for shipment exist at Antofagasta than at Iquique, Lima, Callao or Valparaiso, and the Bolivian port is becoming a favorite with foreign shipping. The action of the Peruvian government in endeavoring to maintain a monopoly of the guano and nitrate of soda trade is likely to result in still greater competition in Bolivia.

Boiler Explosion in a Rolling Mill.—A large boiler used at Hayden's rolling mill exploded on Dec. 5th. The steam drum was torn in strips, a 20-foot section being thrown through a frame building, then across a wide street and through a 10-inch brick wall, finally striking a tree about 300 feet from its starting point. All the mill buildings in the neighborhood of the boiler house are a wreck.

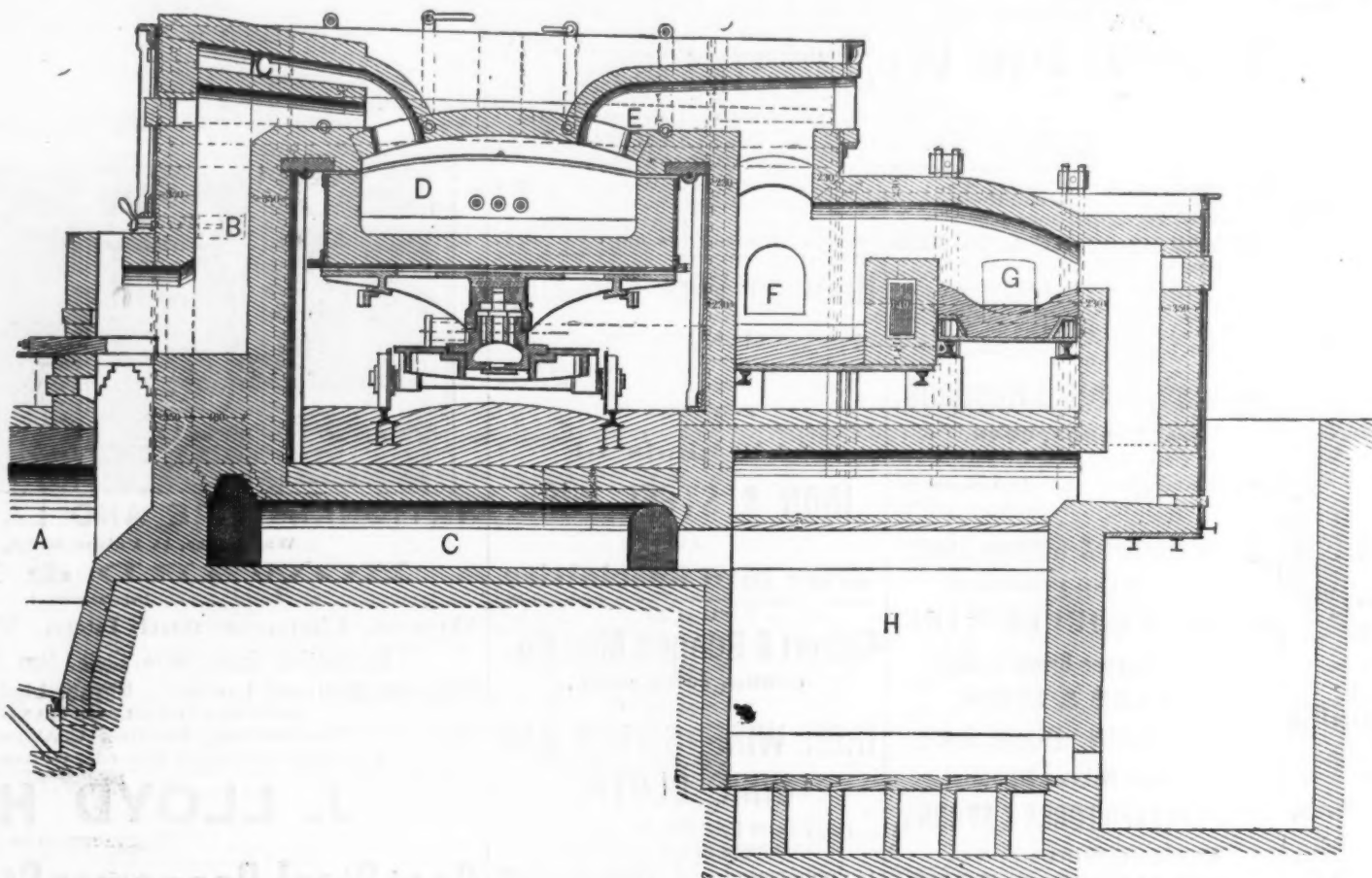


Fig. 1.—LONGITUDINAL SECTION OF THE PONSARD STEEL FURNACE.

the phosphoric pig of the district (the product holding from .1 to .2 of sulphur and from .45 to .8 of phosphorus). The charges were made of various proportions. At first they embraced about one-half pig and one-half old rails, and a fine soft steel was obtained, thanks to the high temperature generated and the use of rich (70 per cent.) ferromanganese. This steel has on analysis shown the following composition: Carbon, .019; manganese, .032; phosphorus, .006. Several experiments were afterward made with an average composition of one-third pig, one-third old rails, and one-third puddled iron, containing .45 of phosphorus. Under those conditions the steel obtained contained .023 of carbon and .021 of phosphorus. The phosphorus, therefore, was not eliminated, nor could it be in the presence of a silicious lining."

Trade-marks are having a hard time of it between the United States courts and the United States Patent Office, in spite of a great deal of legislation and treaty making on the subject. A large number of British trade-marks were registered in our Patent Office prior to 1876, when Secretary Chandler decided that the law did not authorize such registration, the treaty of 1794 not warranting it even before its abrogation, which took place long ago. This decision led to a new treaty being entered into, under which the "subjects and citizens" of each of the contracting parties obtain the same rights as native subjects or citizens in everything relating to trade-marks and trade-labels. British trade-marks are now being registered, which is a recognition of the insufficiency of previous registrations. The first re-registration was made on Monday, but before this course was adopted the United States District courts in several of the States, our own District Court among them, decided that the Constitution does not give to Congress the power to protect trade-marks, while the United States Court for the Southern District of Ohio has decided just the contrary. British trade-marks will of course be governed by the law in relation to the trade-marks of our own citizens, and, while the Patent Office are going to the expense of re-registering many

Railroad, now penetrating the mountain range forming the line between this and Santa Cruz County, is very interesting. The men on the Santa Clara County end are now delving far in the interior of the mountain, and are progressing at the eminently satisfactory rate of 6 feet per day. The rock through which the excavation is now making way greatly resembles coal, both in appearance and in its nature, being of a black, smooth and somewhat brilliant sur-

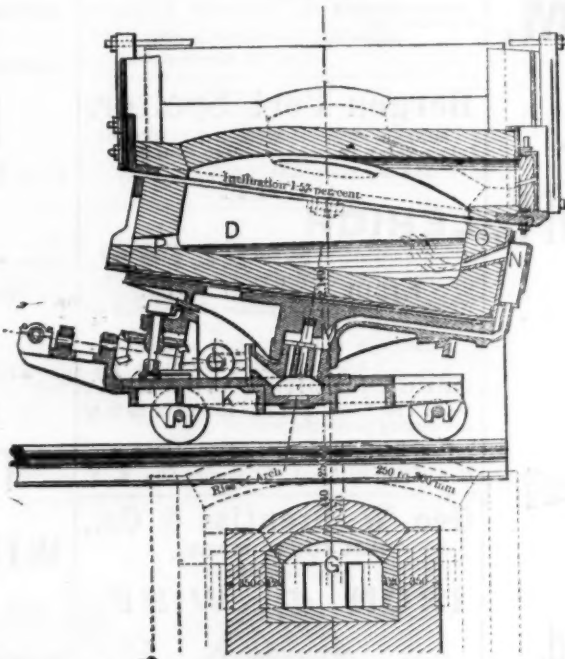


Fig. 2.—SECTION OF THE PONSARD STEEL FURNACE.

face and quite inflammable. Through the numerous crevices in the face of the rock exudes a gas similar to that which comes from petroleum deposits, which causes much annoyance and considerable danger. It rises by its superior lightness to the tops of the tunnel, where it is necessary to frequently burn it to prevent its accumulating in sufficient quantities to cause an explosion. A few days ago a Chinaman was engaged in nailing on a cleat to one of the ceiling timbers, which are 16 feet from the road-bed, and as the gas was seeping in un-

below, and which made things pretty lively in the immediate neighborhood among the timbers and other workmen, though no one else was seriously injured. The Chinaman was much bruised on the side of his head and sustained a severe shock, both from the explosion and fall, but he is now again able to be at work just the same as ever, except for a greater reluctance to drive nails in the tunnel and a slightly increased bald-headedness. It would certainly be a "big thing" for this section if the tunnels now in course of construction on this road should lead to the discovery of coal in large quantities in these mountains.

The British workman, heretofore considered a man to be honored, is being sadly abused just now by British inventors and manufacturers, through "odorous comparisons" made between him and his American rival. Mr. Graham Bell first complained of the difficulty he experienced in getting any novel idea put into material form by British workmen, and this complaint was followed by a more vigorous one in the *English Mechanic*, from the pen of Thomas Fletcher. Mr. Fletcher says that he has had 20 years' experience in experimental work, and that, after having tried in vain to get British workmen to make new forms, he has been compelled either to make them himself, or to send to this country to have them made by American mechanics. Many of the tools used by British workmen he pronounces ill adapted for the uses to which they are put, but after showing their faults and suggesting improvements, he has found that the British workman will not go out of his groove to adopt new ideas, and that English tool makers are themselves obliged to send to this country for American-made tools with which to do their work. He clinches his statements by saying: "The proof of the pudding is in the eating. I have at this moment at least three-fourths of my tools of American manufacture, many of which have been bought at a very fancy price." He thinks that the difference between the workmen of the two countries is that "an English workman does not in the first instance learn what a tool is for and adapt

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SEE PAGE 9.

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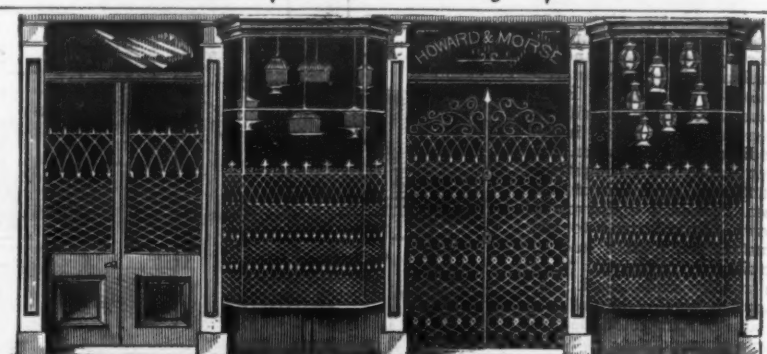
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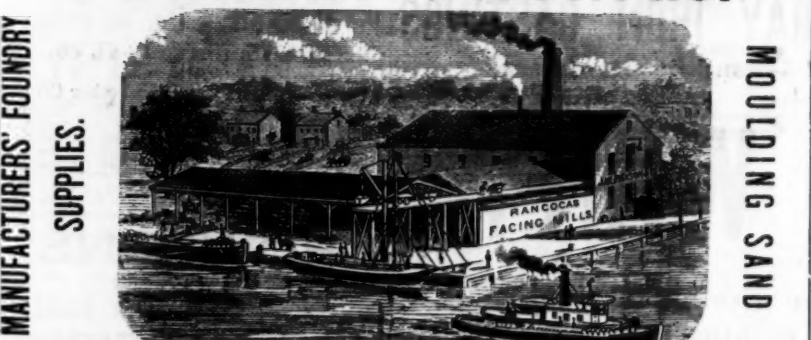
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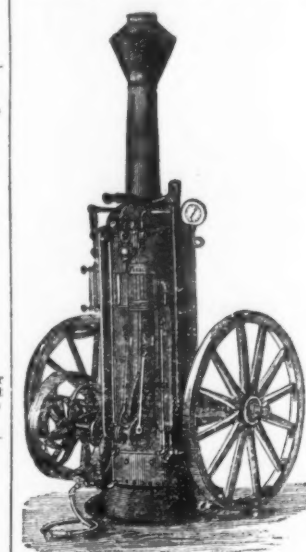


Fig. 1.



Fig. 2.

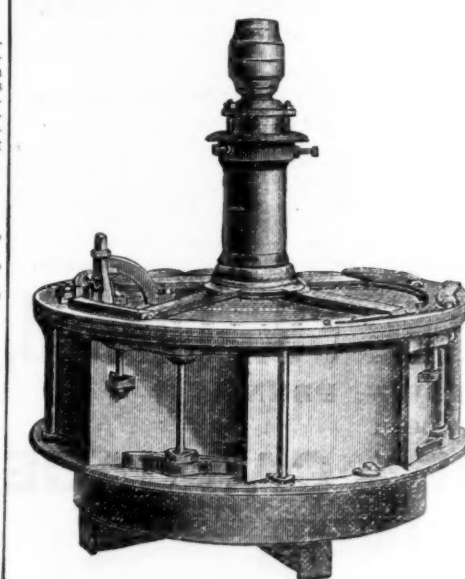
MOUNTED VERTICAL ENGINE.

spring is used to insure smooth and satisfactory work. The boilers are large enough to make sufficient steam without overfiring, the extra height giving large heating surface and good draft. They are tubular and are claimed to be made of the best charcoal iron, the best iron and steel being also used in the engines, which have adjustable brass boxes for crank and cross-head wrists, and every part so fitted that it can be readily removed for repairs.

The maker, A. B. Farquhar, of York, Pa., furnishes them with steam gauge, governor, safety valve and other necessary attachments, with the hinged smoke-stack and communicating exhaust pipe and the spark arrester, making a valuable substitute for horse-flesh in mill and field.

Improved Canadian Turbine.

This wheel consists of the cylinder of the Canadian turbine, made heavier and stronger and placed within an improved wheel case. The arrangement of the wheel is shown in



THE CANADIAN TURBINE.

the cut, which illustrates a 30-inch wheel and its case. The shute case has eight guides, each alternate one being stationary and strongly bolted to the upper and lower ring. This constitutes the frame of the wheel case. The other alternate guides are each pivoted in the center, and thus become gates, being controlled by steel lug pins passing through curved slots in the upper ring of the case, and worked by the gate or slip ring, which is made to revolve through the necessary arc by means of a curved rack, and a pinion stationed on the dome. In this way each gate controls two openings, one at the point, the other at the heel of the gate, and the pressure being equal on each side of the pivot very little power is required in their management. The gates are accurately fitted and tested with a piece of paper, in order to reduce leakage to a minimum. The water is directed with its full force against the buckets, which fit the case very closely to avoid waste of power, and the remaining force is expended as the water descends upon the lower buckets on its exit to the tail race. The number of buckets and guides is increased with the diameter of the wheel, but only enough to allow the water to enter in compact and smooth streams. It is claimed for these wheels that they can be placed in open or covered forebay, or wheel

box, as may be desired. The arrangement of the guides is such as to secure the most effective action of the water at all times. They are little affected by backwater, and will give a good percentage of power even during freshets. The manufacturers, Messrs. Mellert & Co., of Reading, Pa., claim that the simplicity of the wheel enables them to manufacture it at a low price.

The Anthracite Interest.

The Pottsville *Miner's Journal* of the 29th ult. has the following concerning the anthracite trade for the year and also the outlook for next year:

In the Schuylkill region mining has been uninterrupted during the past week, but it has been determined to stop work after Saturday next for one week. There is scarcely a full week's work left to the region, calculated according to the limit of 17,000,000 tons total production; but as there is already a sufficiency of coal in Philadelphia to supply present demands, it is deemed prudent to hold the quantity still due the region's allotment until a later period.

The coal season of 1878 is now near its close. The struggles of operators and shippers against an overstocked market in the beginning, and their frantic efforts to force a large production on the market for nearly two-thirds of the year, their final awakening to their folly and settling down to the conclusion that no article of commerce can be forced on an unwilling market without a great sacrifice to the producer, and the consequent limiting of production to 17,000,000 tons, are all matters of past history. There is little more to be said of the trade of 1878. Interest now centers in that for 1879, and the leading feature of that interest is in reference to a new combination. Will there be a combination to control the trade of the coming year? Two weeks ago circumstances warranted the prediction that there would be; but as the year draws to a close the prospects of such a desirable consummation are decidedly less promising. The Lehigh operators have had two meetings without accomplishing anything. It is known that the operators of that region are not a unit in regard to a combination on any terms. At least one prominent operator has consistently stood out against any new compact, and was equally opposed to the last one, but being a minority of one was induced to make his opposition a silent and therefore ineffective resistance. How much strength he has gained by his earnest endeavors to prevent a new combination cannot be known until there is something approaching a general assemblage of the operators of that region.

Another embarrassing feature of the Lehigh's discussion of the question is the prospective loss of the tonnage they have heretofore had from the collieries owned or controlled by the Erie Railway, which will next year be carried by the Delaware and Hudson Company to Carbondale, and delivered to the Erie at that point. The Erie Company, it is said, will claim a separate interest and demand that its proportion of next year's business shall be 1,000,000 tons. The Lehigh Valley Company will likely supply this loss from other sources, which will add to the existing embarrassment.

President Gowen of the Reading expresses his indifference to the matter of a combination, and at present writing seems to be inevitable—a coal war. It is calculated that the market will take in 1879 21,000,000 tons of coal, which is certainly the maximum figure. During the last six months of 1878 all the companies did their utmost to throw coal into the market. The result was a shipment for that period of 12,000,000 tons. This quantity could be easily produced for each six months of next year, and would be in the event of no arrangement being made to prevent it. It will thus be seen that 5,000,000 tons of coal would be the disturbing element in next year's market, unless some interruption suspended mining during a portion of the year, and a serious one it would prove.

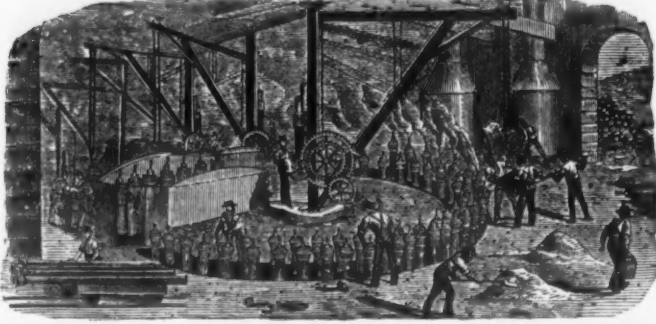
E. H. McDowell, an engineer who left this city a few days ago on his return to the Black Hills, predicts that the number of stamps in the mining region a year hence will exceed 1000. The present number is fully 850, mostly built in Chicago.

Ericson's torpedo boat has made another trial, and we are informed that the public exhibition will take place about a week hence.

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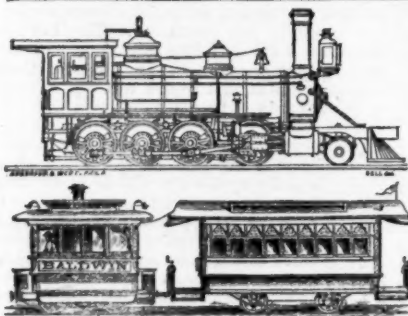
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Bessemer Rounds and Squares,	Shovel Steel,	Tinned Wire,	Hay Bailing Wire,
Cutter Shoes,	Hoe, Fork & Pick Steel,	Wire for Barbed Fencing,	Broom Wire,
Sleigh Shoe Steel,	Tack, Plate and Shoe Nail Steel,	Wire for Farmers' Stock,	Rivet Wire,
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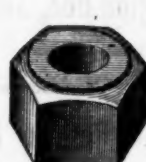
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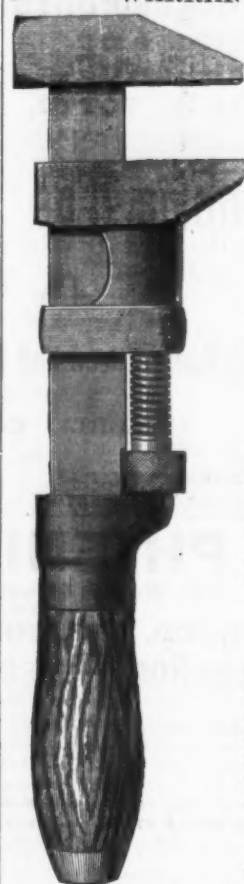
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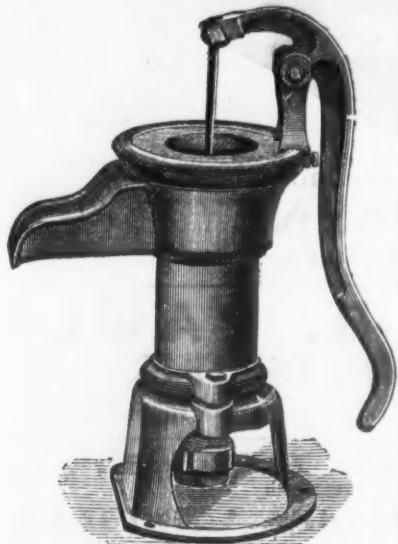
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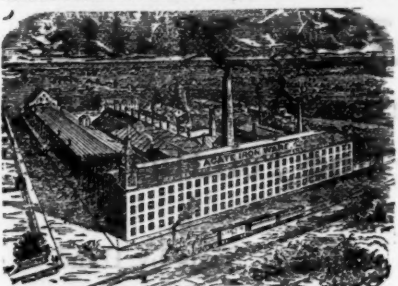
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Japanned, Figured Enamelled, Nickel Plated
and Real Bronze Butts. Also a full line of

IRON & BRASS PUMPS.

Cistern, Well and Force Pumps, Yard Drive Well,
Garden Engine and Steam Boiler Pumps, Hydraulic
Rams, etc., and all with the most modern improvements.

Centennial Spring Hinges.

This Hinge has two flat coil springs,
very powerful. It has a heavy solid
pin, giving much less friction than a
hollow pin. It has broad, solid bear-
ings in the knuckle, which do not wear
down readily and let the door sag. It is
Fast Joint, therefore can be used for
either right or left hand. By actual test
it has an average of 50 per cent. more
power than other Spring Hinges in com-
mon use of same size.

27 Fine Castings a Specialty.

NEW BRITAIN, CONN.

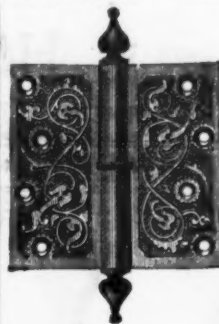
Warehouses,

98 Chambers St., New York.

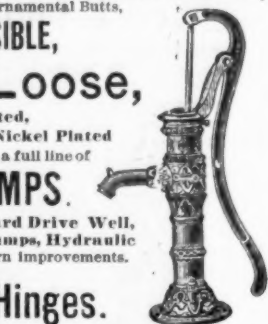
67 Kilby St., Boston (Pumps).

Henton & Denckla, 507 Com-
merce St., Phila. (Butts.)

Send for Illustrated Catalogue and
Price List.



Single Action.



Double Action.

THE
IMPROVED HOWE SCALES.

PARIS, 1878,



THEY WERE AWARDED
THE GOLD MEDAL,
AND SEVERAL SPECIAL MEDALS OF GOLD, SILVER
AND BRONZE. AT BALTIMORE, THE MARYLAND IN-
STITUTE AWARDED THE "HOWE" THE GOLD MEDAL.
Also, at KENTUCKY, MINNESOTA, MISSOURI,
OHIO, WISCONSIN, IOWA and MARYLAND THE
"HOWE" TOOK THE First Premium. THE U. S. GOVERNMENT HAVE FOR THE THIRD CONSECUTIVE
YEAR AWARDED THE "HOWE SCALE CO." THE CONTRACT FOR SCALES.



Made by the

HOWE SCALE CO.,
Rutland, Vt.

GENERAL AGENCIES:

PRIEST, PAGE & CO.,
325 Broadway, New York.
145 Franklin St., Boston, Mass.
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A. M. GILBERT & CO.,
95 to 101 Lake St., Chicago, Ill.
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H. GADBURY
4 Light St., Baltimore, Md.
J. F. DENNIS,
European Manager,
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The only **GENUINE D. R. BARTON Tools**

ARE MADE BY

THE D. R. BARTON TOOL CO.,

Cor. Mill and Furnace Streets, ROCHESTER, N. Y.

AGENCIES:
HEATON & DENCKLA, 507 Commerce Street, Philadelphia, Pa.
H. O. STRATTON, 33 Oliver Street, Boston, Mass.
HUNTINGTON, HOPKINS & CO., Sacramento.
NATHAN WEED, 4 Gold Street, New York.

AMERICAN FACING COMPANY,
No. 515 West 15th St., New York.

Manufacturers of and Dealers in all kinds of

FOUNDRY FACINGS.

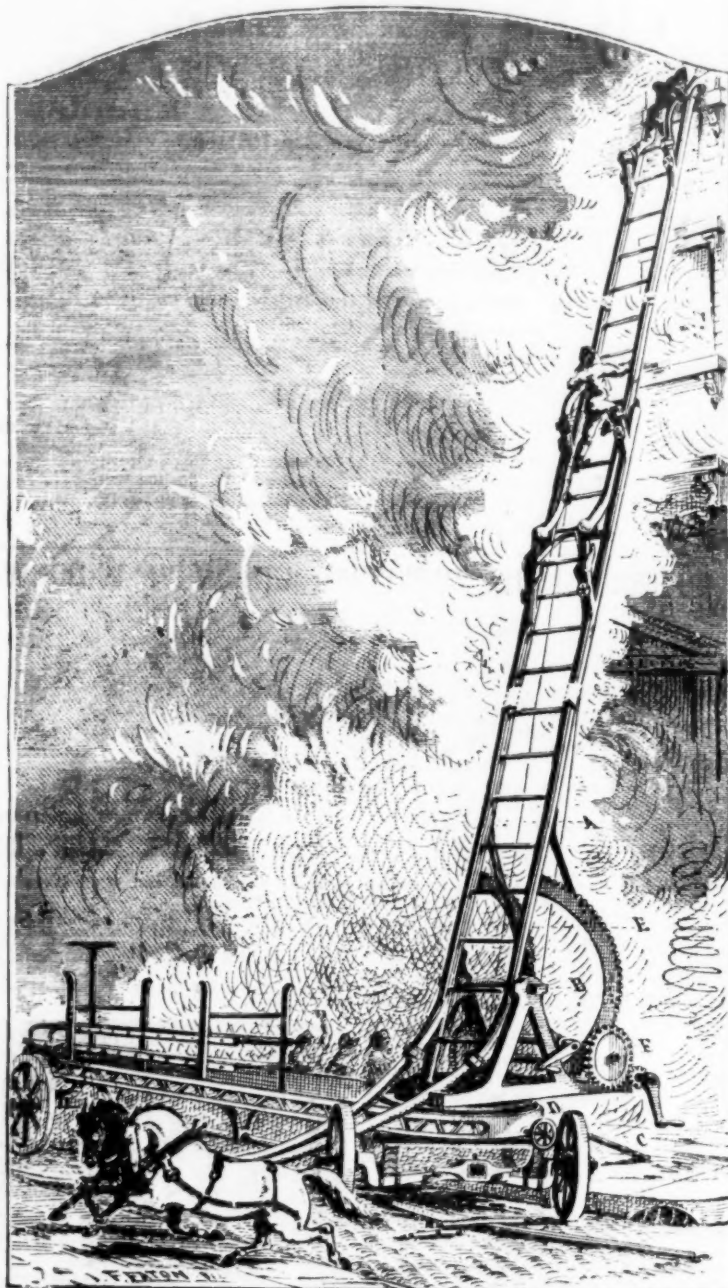
Also, MOULDING AND FIRE SAND.

The Davis Fire Escape.

We illustrate upon this page a decided
novelty in the shape of a hook and ladder
truck (The Davis Fire Escape, 105 Water
street, New York), intended to take the
place of the ordinary trucks and wooden
ladders. The length of the truck over all is
45 feet, and the driver's and tillerman's seats
are 7 feet above the ground. The axles are
27 feet apart, with 5 feet 6 inch wheels.
The striking novelty is the methods of con-
structing the ladders and the provisions
made for utilizing them. The sides of the
ladders are of 3-inch steel boiler tubing,
3-16ths of an inch thick, connected at the
joints by steel sleeves. The rungs are of
tube, brazed to side tubes. The ladder thus
made weighs about 9 pounds per lineal foot.
The whole truck weighs about 5000 pounds.
The ladder is made in two sections of 45
feet each, and when extended to the full
length lap over each other at the center 6
feet, giving a total height of 84 feet. As the
side tubes are not tapped, but continuous
from end to end of each section, they are
made available as stand pipes. This very
novel feature of making the sides of the
ladder answer instead of lines of hose,
greatly decreases the weight to be carried
by the ladder, while it does away entirely
with the labor of getting up a heavy line of
hose. At the top of each length there is a
coupling for attaching a nozzle, with a short
piece of pipe to give the requisite flexibility.

socket having rubber packing, the weight
of the ladder making the joint tight. In
the cut the fireman on the top of the lower
ladder is represented as throwing a stream
from the left-hand pipe or ladder side, while
the one at the extreme top is playing from
the right-hand side. There are a considera-
ble number of very obvious advantages ob-
tained by this method of construction. The
tubular steel ladders give the greatest stiff-
ness and strength with the least material,
while their utilization for leading the water
to the nozzle obviates the difficulties and
delay of getting a line of hose up a long lad-
der. The ladder being of metal with cold
water passing through it, is in no danger of
being burned no matter how hot a flame it
may be exposed to, a danger to which
wooden ladders are peculiarly liable, and
by which they are often greatly injured.
The nozzles and sufficient hose are al-
ways kept in position for immediate use.
Eight men can operate a truck of this
kind, which we believe is five or six less
than are usually required. We do not know
the exact figures in regard to the cost, but
should judge that a truck of this kind can
be put on the market much below those of
the usual patterns.

An interesting story of an inventor's trials
and tribulations, finally ending, not in his
own success, but in that of a third party, is
told in explanation of a decision of the
United States Circuit Court of New York,



THE DAVIS FIRE ESCAPE.—LADDERS IN POSITION WITH HOSE CONNECTED.

In the engraving the ladder is shown ex-
tended, but, in order to bring the drawing
within the size of our page, it was necessary
to break out a portion from each length, so
that the ladder does not appear as lofty as
it would when actually in position. At the
bottom it will be observed that the tubes
are connected with lines of hose from the
steamers, or hydrant when the Holley sys-
tem is employed. The construction of the
ladder is very simple. The sides of the
truck proper are of iron or steel angle bars
and channel plate, disposed so as to make a
very strong and light truss. Over the
"fish wheel" on the forward axle there is
a sort of turn-table, shown at D, which car-
ries the machinery for raising and turning
the ladder. The ladder is put in position by
running the truck as near the curbstone as
possible, then adjusting the brace C so as to
steady the ladder as it rises. The ladder
is then raised above the truck by means of
the crank operating through the gears F on
the sector E. This raises the ladder on the
fulcrum B to the proper angle. It is, how-
ever, still over the truck and not inclined
toward the building, nor is the upper length
extended. The windlass, worked by the
upper crank, is now put in operation, and
the upper length of the ladder extended by
means of it, if necessary. Then by operat-
ing the hand wheel, shown at the side of the
turn-table, the ladder is turned in the re-
quired direction, and the upper end lowered
against the building. The necessary water
connections have of course been made in the
meantime with the fire-engines, and the ap-
paratus is ready for work as soon as the
men reach the top. The connection between
the upper and lower sections is made by an
automatic coupling when the ladders are
fully extended. It consists of a short sec-
tion of tube working in a ball and socket-
joint, and is guided into a funnel-shaped

granting an injunction against the Western
Union Telegraph Company against the use
of wires insulated with gutta percha, and
ordering an accounting with the holders of
the patent therefor. Gutta percha became
an article of commerce about 1845. At that
time, and for some years thereafter, Morse
and others were experimenting with various
articles designed to serve as insulators for
wires used under water. In 1845 Faraday
first made public the insulating properties of
gutta percha, but he was preceded in the
discovery by George B. Simpson, who, in
November, 1847, filed his first application
for a patent for the use of gutta percha as
an insulator. He was too poor to pay the
fees and had to borrow the amounts re-
quired, but his application for a patent was
refused. In the fall of 1848 his invention
was tested at Baltimore and proved success-
ful, but five successive applications for pa-
tents were refused, and Mr. Simpson, who
had paid all the fees with borrowed money,
at length abandoned the attempt, and in
1850 went to California. He remained there
eight years, but returning to the East found
his invention in general use. Then he be-
gan again, with his own money, the battle
for his rights. For eight years he filed ap-
plications with each new Commissioner of
Patents with the usual result, rejection. In
1866 he got a relief bill through Congress,
and under this obtained a favorable report
and a patent. He was at the time (1867) a
paymaster in the United States service, sta-
tioned at New Orleans, and three months
after the patent was granted died of yellow
fever. His widow sold the patent right for a
trifle to Arthur N. Eastmann, who has
since died, and it is the assignee of the latter
who has won the suit in New York. The
story is not a very encouraging one for in-
ventors, but it may be for assignees and
lawyers.



USE THE BEST.

NEW



THE NEW AMERICAN FILE COMPANY have the exclusive right to use the Bernot process for cutting Files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing Files and Steel.

NEW AMERICAN FILE CO., Pawtucket, R. I.

AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.

Granted for



McCAFFREY & BRO.,
Pennsylvania File Works,
Fourth St., north of Columbia Ave., Philadelphia, Pa., U. S.

Superior Goods.



Silver Medal.

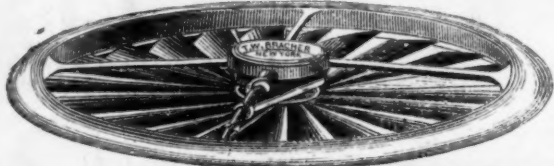


Domestic and foreign buyers who are desirous of handling a superior File or Rasp should send us their orders. Gentlemen visiting the Exhibition Universelle in Paris are invited to examine our exhibit at D 3, American Section.

Highest Premium.



Steam and Frost prevented on Show Windows.



REVOLVING VENTILATORS

For everything (and every size), from a hat or cap to an exhibition building. Kitchens, Laundries, &c., ventilated without draft. Durable, strong, without rivets or solder. Oiled for six months. Each one has storm cap. Retail price, size six inch diameter, \$1.00 and upwards; apparatus with which any one can cut circles in glass, 15 cents each.

Protective Ventilators avoid drafts, exclude dust, dampness, malaria and germs of disease; adopted by hospitals, schools, institutions, &c.; applied to any window or room.

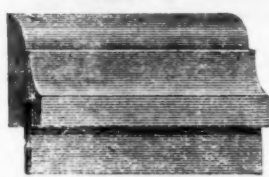
Prof. A. L. Loomis, M. D., University of City of New York, writes as follows: "From my personal experience and that of my patients who have used your Ventilator during the past six months, I am convinced that your method of removing dust, impurities and dampness from the atmosphere in the best which has as yet been proposed. By it the air in an apartment can be constantly changed without causing drafts. I would especially recommend its adoption in sick rooms, sleeping apartments, nurseries and school rooms."

Air Filters and Moisteners, placed over hot-air registers of furnaces, &c., prevent dust and supply steam filtered air. Prices and discounts to the trade sent on application.

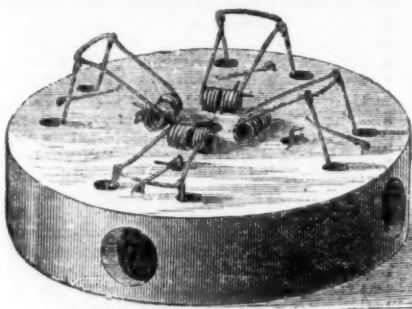
The "Economy" Molding Weather Strip is perfect in every respect. By enlarging edge of rubber or felt, and making slot in molding to correspond (see engraving), we save all after expense of molding. Once purchased it will last a lifetime, because rubber, etc., has only to be removed by taking old piece out of either end of molding, and sliding in a new piece. By this method of securing rubber all uncertainty of fastening or undoing of glue or tacks is overcome.

Rubber supplied with enlarged edge and instructions to enable Car Manufacturers, Carpenters, Builders and far off trade to make slots in Sashes, Doors, Mouldings, &c., and thus make perfect Weather Strips.

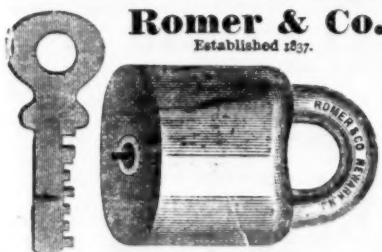
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BRACHER VENTILATOR CO., No. 3 Park Row, New York.



"Common Sense"
MOUSE TRAPS,
For Home and Export Trade.
BEST IN MARKET.
RIPLEY MFG. CO.
Unionville, Ct., U. S. A.,
Manufacturers of
House Furnishing Hardware.



Romer & Co.
Established 1837.
Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches, Also Patent Stationary L. R. Car Door Locks, Patent Piano and Sewing Machine Locks.
111 to 145 Railroad Avenue, NEWARK, N. J.
Illustrated Catalogue sent to the trade on application.

MACHINE MOULDED
MILL GEARING,
AS ACCURATE AS CUT GEARING
AND MORE DURABLE IN USE.
Saves Time and Expensive Patterns.
SHAFTING, PULLEYS AND HANGERS,
A SPECIALTY,
LEFFEL TURBINE WATER WHEELS,
STEAM ENGINES AND BOILERS,
MIXERS FOR FERTILIZERS AND CHEMICALS.
POOLE & HUNT, Baltimore.

FILES & RASPS,
HAND-CUT. Manufactured by
JOHNSON & BRO.
No. 1 Commercial Street, Newark, N. J.

ESTABLISHED 1860.
Chas. Spruce & Co.,
Manufacturers of HAND CUT
FILES AND RASPS.
Every File warranted.
CHALMERS & MURRAY,
Sole Agents, 76 Reade St., New York.

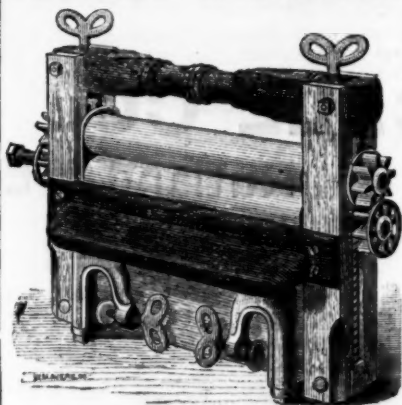
SPENCER & UNDERHILL,
94 Chambers St., N. Y., Agents for
American Screw Co.'s Wood, Machine and
Rail Screws, Stove and Tire Bolts, Rivets, &c.
O. Ames & Sons, Shovels, Spades and Scoops.
A. Field & Son, Tacks, Brads, Nails, &c.
G. F. Warner & Co., Carriage Clamps.
We have also on hand a general assortment of Hardware



THE GIANT PAD LOCK.
Manufactured by
THE SMITH & EGGE MFG. CO.
(Centennial Award.)

"Superior in Every Respect."
This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted.
Orders solicited. Address as above.
Lock Box 105, Bridgeport, Conn.

Keystone
CLOTHES WRINGERS.



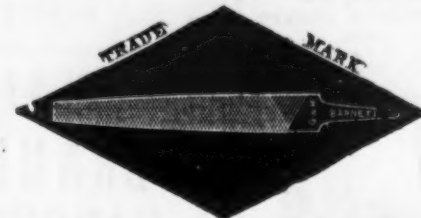
Wood Frame Cog-Wheel Wringers.		
No.	Size of Rolls.	Price per doz.
10	10X1 1/4	\$60.00
12	10X1 1/2	62.00
15	11X1 1/2	68.00
18	12X1 1/2	71.00
Wood Frame Friction Wringers.		
No.	Size of Rolls.	Price per doz.
1 1/2	10X1 1/4	\$51.00
1	10X1 1/2	54.00
3	11X1 1/2	62.00
Self-Adjusting Iron Frame Friction Wringers.		
No.	Size of Rolls.	Price per doz.
2 1/2	10X1 1/4	\$7.00
2	10X1 1/2	34.00
4	11X1 1/2	62.00

EVERY WRINGER WARRANTED.

Special rates given for export.
Send for price list of other goods for home and export trade.

F. F. ADAMS & CO.,
Erie, Pa.

Black Diamond File Works.



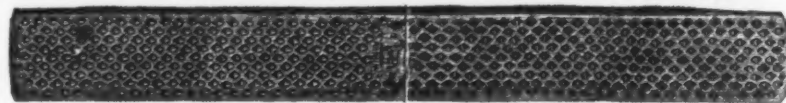
Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."

G. & H. BARNETT,
39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL,
Manufacturer of HAND CUT FILES.

Warranted CAST STEEL. 157 Tenth Street, Williamsburg, New York.
All descriptions of Files made to order. Price List mailed on application. Established 1863.

HELLER & BROS.,
MANUFACTURERS OF CELEBRATED
AMERICAN HORSE RASPS AND FILES,
NEWARK, N. J.



In view of the many so-called improvements and ingenious arrangements of the teeth of Horse Rasps made within the last few years, we take occasion to recommend our own Horse Rasps, made of the best American Steel, all hand cut in the old style by the most skilled mechanics; and we guarantee them to be unequalled in the market, as is best evinced by the unanimous verdict of all the skilled horsehoers who are using them for the last fifteen years all through the United States.
For sale by the leading Hardware and Iron Dealers in the United States and Canada.

AUSABLE HORSE NAILS
POLISHED OR BLUED.
HAMMERED AND FINISHED



The Ausable Nails

Are Hammered Hot,
And the Finishing and Pointing are
Done Cold,

Thus Imitating the Process of Making Nails by Hand.

Quality is **Fully Guaranteed.**

For Sale by all Leading Iron and Hardware Houses.

ABRAHAM BUSSING, Secretary,
4 Warren Street, New York.

LIGHTNING HAY KNIVES,
WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marches.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 5 lbs. weight, suitable for shipping by land or water to any part of the world.

Manufactured only by

Hiram Holt & Co.,
East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.
SEMPLE & BIRGE MFG. CO., Agents at St. Louis.

A. FIELD & SONS

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH

WIRE NAILS,

TACKS, SHOE NAILS,

And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

Hoisting Machinery

MANUFACTURED BY
CRANE BROTHERS MFG. CO.,
Chicago.

The Upright Family Scale

PATENTED.



With Tin Dish.

Weighing 12 lbs.
by 1/2 lb.

List \$16 per
Dozen.

Liberal Discount
to the Trade.

This Scale has an
attachment for
Taking the
Tare. Just the
thing for family use.

Manufactured by

JOHN CHATILLON & SONS,
89, 91 and 93 Cliff St., NEW YORK.

Geo. M. Eddy & Co.,
351 & 353 Nassau Ave., Brooklyn, N. Y.
Manufacturers of

MEASURING TAPES.

Of Cotton Linen and Steel.

For all purposes for which Tape Measures are required.
Only manufacturers of

Paine's Patent U. S. Standard Steel

Measuring Tapes,

Pat. Spring Measuring Tapes

of Linen and Steel.

FINE TEMPERED STEEL SPRINGS.

SINE TEMPERED STEEL BAND SAWS.

From 1/4 inch wide upward. Warranted tougher than
any other Band S.W. Catalogues on application

PRIZE MEDALLISTS:

London, 1862; Oporto, 1865; Dublin, 1865; Paris,
1867; Moscow, 1873; Vienna, 1873, and only
Award and Medal for Self-Colling Steel
Shutters at Centennial Exhibition,
Philadelphia, 1876.

CLARK & CO.,

ORIGINAL INVENTORS AND SOLE

PATENTEES OF

Noiseless Self-Colling Revolving

STEEL SHUTTERS,

FIRE AND BURGLAR PROOF.

Also Improved

Rolling Wood Shutters

Of various kinds. Clark's Shutters are the Best
and Cheapest in the world. Are fitted to new
Buildings, Levees, Libraries, Delaware and Hud-
son Canal Co.'s Building, Transatlantic Steamship
Co.'s new Dock, American News Office, &c., Posey
County Court House, Mt. Vernon, Holt County
Court, Oregon, Mo. Also to buildings in Boston,
Cincinnati, Detroit, Janesville, Wis., Baltimore,
Canada, &c. Have been for years in daily use in
every principal city throughout Europe, and are in-
dorsed by the Leading Architects of the
World.

Office and Manufactory,

162 & 164 West 27th Street, N. Y.

ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the

Ansonia Brass & Copper Co.

Office, 19 & 21 Cliff Street,
NEW YORK.



Cut Showing Round Platform.

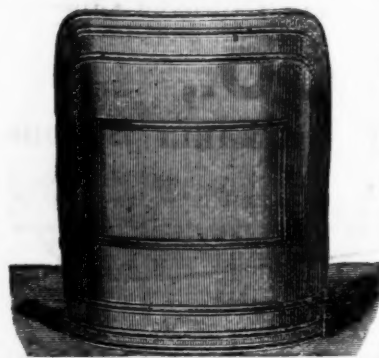
Section Showing Edge.

ANSONIA Bronzed Fire Screen,

With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or
Shield, as shown in the illustration, is especially
designed for the safety and protection of walls, fur-
niture, woodwork, paper or varnish from heat.
Being constructed of metal, with firm and substan-
tial edges, curved in form to stand alone, it may be
easily adjusted to any position about a stove, before
a grate or fire place. The demand for something
useful, durable and ornamental as a Fire Screen has
long been felt, and having finally accomplished the
desired result, we are prepared to fill all orders
promptly.



BROWN & SHARPE MFG. CO

Providence, R. I.,

MANUFACTURERS OF

MACHINERY & TOOLS.

Gears Cut and Index Plates Made and
Drilled to Order.

PATENT CUTTERS FOR THE TEETH OF GEAR WHEELS



can be sharpened by grinding without changing their
form. Cutters made on this plan will outlast many of
the old form, with the advantage of being always ready
for use. If the cutter becomes dull before a wheel is completed, it can be taken out, sharpened and
returned to its place in a few moments without risk of altering the form of teeth to be cut. Cutters
for milling any irregular form made to order on the same plan. Parties having occasion to use mills
for irregular shapes on sewing-machine, gun or other work, will readily see the advantage such cutters
possess over those in general use, both as regards economy and convenience. Descriptive circular
with price list sent by mail on application.

SABIN MFG. CO.,

MONTPELIER, VT., Manufacturers of

PATENT DOUBLE ACTING SPRING BUTTS,

Sabin's Lever Door Springs

For Heavy Doors.

The BOSS and CROWN SPRINGS for Screen and Light Inside Doors.

General Agents. HENRY BROOKS & CO., 127 Milk Street, Boston.
E. P. WHIPPLE, 120 Chambers Street, New York.
KELLOGG, JOHNSON & BLISS, 108 Randolph Street, Chicago.

RHODE ISLAND HORSE SHOE CO.,

OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.

Manufacturers of

PERKINS and RHODE ISLAND PATTERNS of

HORSE AND MULE SHOES.

The Condition of British Industry.

A correspondent writing from London
under date of Nov. 14th, presents the follow-
ing picture of the condition of British in-
dustries, which we certainly hope is over-
drawn:

British trade has now come to a state that
is truly deplorable. The cotton trade seems
all going to ruin; the iron trade is not a
whit better off; the coal trade is only a trifle
better; and other industries, almost without
exception, are in a worse state than has been
known before since the Crimean war. Not
a day passes but tells of more commercial
failures. The newspapers seem carefully to
avoid giving any prominence to such news,
and many failures for sums of \$500,000 or
more are noticed in a short paragraph of
only two or three lines, and that, perhaps, a
mere note at the foot of some column, where it
is likely to attract very little attention.

Here are a few prominent failures noticed
in the papers of yesterday and to-day only.
They are strictly the occurrences of only
two days, though the list certainly is a trifle
longer than usual for that length of time.
The pound sterling is taken as equal to ex-
actly \$5. Messrs. Matthews & Thielman, of
Glasgow, merchants, have failed, with li-
abilities amounting to \$2,432,690, and assets
\$101,195, showing a deficiency of \$2,331,495.
C. Donner & Co., of Great St. Helens, have
failed, with liabilities of about \$500,000.
F. Whitaker, of Halifax, Yorkshire, wool
staplers, with liabilities of \$200,000 and as-
sets of \$50,000. The above are of yester-
day's news. This morning the failure is
noticed of Messrs. Potter, Wilson & Co., of
Glasgow, merchants, with liabilities of
\$1,080,887 and assets \$810,197, showing a
deficit of \$270,690. Several more failures
for comparatively small amounts could be
given. The liabilities of the four firms men-
tioned above amount to \$4,213,577.

The masses of the English people are very
poorly prepared for times like these. In the
first place, very few of them own the homes
in which they live; but few of them know
that independence which comes from the ab-
solute ownership of a home. This first great
incentive to prudence and accumulation of
property is entirely wanting. The chief ob-
stacle in the way of this is the fact that the
land is not for sale. They understand the
practice of a rigid economy, for their wages
are low; but the trouble is that they spend
their all as they go. In the strictest sense,
the British workmen may be said to live from
hand to mouth.

Another sad fact is the national habit of
beer drinking. The beer used by working
people costs, in London, eight cents a pot
(quart), and in other parts of the country it
is often no more than 6 cents. One pot of
beer a day is certainly the least quantity a
workingman uses. This alone will come to
\$20 or \$25 a year. Two pots a day are far
more common. Add to this the fact that
his entire family uses beer, and it will be
easily understood that the beer money of a
single family among the workpeople readily
runs up to \$75 or \$100 a year. It is not at
all uncommon to find one-third of the whole
family income spent for beer.

The masses of the English are also very
deficient in education. The sum of the mat-
ter is about this: The system of the country
has forced the masses very low down into
ignorance and poverty, and they seem to
have been taught to drink plenty of beer,
and spend their money as fast as it came.
Their faults are many, it must be confessed,
but I look upon them as undeserving of
blame, after all. At all events, when they
get out of employment by tens of thousands,
as they are now, very few have anything to
fall back upon, and they are charges on the
parish at once, and almost en masse.

Another thing that bears heavily upon the
working classes is the enormous cost of all
staple articles of food. A fair quality of
beef steak is to be had nowhere in England
or Scotland under 28 cents a pound, and the
poor man's staple, potatoes, rarely costs less
than \$1.25 or \$1.50 a bushel.

In the cotton manufacturing districts
many of the mill owners are struggling for
existence. Within the last month or six
weeks mills have been closing and resorting
to short time everywhere. Wages were re-
duced 10 per cent. all through that district
last spring; many mills have now taken off
another 10 per cent., and all are threatening
a second reduction.

Many of the masters now freely admit that
American competition in their foreign and
even in their home markets has a great deal
to do with the crisis in the cotton industry.
As an average, the mills of the whole cot-
ton district are now admitted to be running
only about four days a week, and the trade
rapidly grows worse. Many mills have en-
tirely stopped. In Blackburn, a town of
80,000 inhabitants, there are now between
8000 and 10,000 operatives of the cotton
mills entirely out of work. The greater
part of them are receiving parish relief; but
the amount so large a number can receive is
so very small that it scarcely keeps them
from absolute starvation. A telegram re-
ceived from that town yesterday says: "Great
distress prevails in every ward, employment
in the cotton mills is decreasing, and a great
crisis is at hand."

Some other towns are just as badly off as
Blackburn. The worst has not come yet,
however, and it is feared that Christmas
will find the distress doubly intensified. In
Oldham the mills have had scarcely any-
thing else than losses to report in the whole
of the last 18 months, and several firms
have had adverse balances of \$25,000 each.
The Greenacres Spinning Company, which is
one of the model workingmen's companies,
and which used to declare 30 per cent.
dividends of profit, has now declared a loss
of nearly \$10,000 in the last quarter. In
Darwen the largest mill has stopped entire-
ly, and in Preston 314,500 spindles are idle.

In the coal and iron trades wages have
been reduced from 15 to 20 per cent. in the
last year, and the last reduction of the
Northumberland miners was 12 1/2 per cent.
The average of Scotch miners' wages is less
than 75 cents a day, in Wales about 85 cents,
and in Northumberland about \$1.25. In the
Black Country scarcity of work has caused
great distress and destitution. It is asserted
that at Wolverhampton and other centers of
the coal and iron trades many hundreds of

people are actually starving. Families are
often without food several days in suc-
cession. In some cases men have been found
to be so weak from want of food that they
have actually sunk to the ground exhausted
upon attempting to work. The same story
comes from Sheffield. Thousands are entire-
ly out of work, and almost none work full
time.

The Engineer is one of the very best of the
journals devoted to the coal and iron trades.
The regular correspondent of that paper
writes as follows from Sheffield:

"Dr. Foote, the medical officer, says the
present condition of the iron workers and
their families is beyond comparison with
anything in previous years. The distress is
deplorable and harrowing to behold; and
the doctor adds: 'I can truly say I have
never witnessed anything like the present
scarcity and poverty.'"

Then the correspondent adds something
that shows that American competition is felt
in the iron trade, too:

"Although trade is known to be bad in
America and Germany, the local firms in
Sheffield who import American and German
productions are about the only persons who
do not complain of dull trade. I was talk-
ing to the senior partner of one of these firms
on Tuesday and he told me that the demand
for the innumerable Yankee notions, as well
as German articles, particularly those known
as Lancashire tools, shows no appreciable
falling off. 'During all this prolonged period
of depression,' said he, 'we have really not
felt much change.'"

That is most remarkable language for an
Englishman, and especially for one versed in
the iron trade. Those same Yankee notions
are also sold at scores of places in London,
and the amount of English goods displaced
by them must be very considerable. They
are attractive alike by their quality, adapta-
bility and cheapness. The very fact that an
article is American-made has come to be a
recommendation of its quality.

A year ago the building trades were com-
paratively brisk, and in some cases the work-
men actually were on a strike for better
wages. Now they are glad to get work
even at lower rates than a year ago. The
tin mining trade of Cornwall is also in a
state of stagnation, and the same is true of
the potteries of Staffordshire. No industry
is doing well, and the best that can be said
of any is that they are working full time and
just managing to live. This last may be
said of the woolen and worsted industries.
The trade has diminished considerably, but
there is no serious complaint.

Even the farmers complain of hard times
and of the foreign supplies of grain, meat
and other staple foods which compete with
the English products.

The land-owner in England is not gener-
ally directly connected with the tilling of the
soil; he merely collects his rents. The far-
mer who pays high rent very naturally finds
fault with the cheap foreign products which
take away his profits. If the American far-
mer loses his crop he loses not much more
than his labor; when the English farmer
loses a crop he has a large money loss be-
sides, for he still must pay his rent, which
averages \$8 or \$10 an acre.

On nearly every hand there is nothing
but ruin to be seen in England's once pros-
perous industries.

A Large Steel Product.—The Scranton
Republican says: The steel works made in
November, in 25 1/2 turns, 5477 tons 11 cwt.
of ingots, or an average per turn of 214
tons 16 cwt. This is believed to be the larg-
est month's average per turn ever yet made
by two converters anywhere in the world.
The steel rail mill made in November, in
25 1/2 turns, 4314 tons 6 cwt. of first quality
rails, or an average per turn of 169 tons 3
cwt. This is claimed to be the largest
month's average per turn ever yet made any-
where in the world on one rail train. More
than one-half the above was on light 50-
pound rails. The amount of this product
will be better appreciated when we explain
that the steel works and mill are running
single turn, or half time—that is, days only,
and not night and day. The largest month's
work, double turn, ever made at the old
iron rolling mill on one train was in May,
1873, when 4662 tons rails were turned out,
which was at that time an unprecedented
figure; 4000 tons rails was then considered
a large month's work, double turn, yet this
is now beaten running single turn, or half
time. The Iron Age will please take notice
that this is not a case of "spurts in manu-
facturing," but is the result of long-continued
efficient management, and indicates the pro-
gress and ability of our American ironmas-
ters. The mill here will probably steadily
continue to increase its product from month
to month.

The "Black Star" Boiler Fluid.—
The formation in steam boilers of a hard
scale, which has to be removed by the slow
and laborious process of picking, and which
gradually accumulating absorbs otherwise
useful heat, causes the iron to burn and
rapidly decay has always proved a constant
source of trouble and expense. Money ex-
pended to secure a means of preventing the
formation of this scale and of removing it
when formed without injury to the boiler,
would be an investment more than repaid in
actual saving in fuel. Articles claiming this
valuable function are in the market, and
among them a boiler fluid, called the "Black
Star Anti-Incrustator and Acid Water Neu-
tralizer," which is said to have been used in
many well-known establishments with good
results. Chemical analysis shows it to con-
tain alkali and woody matter which neu-
tralizes the acid water of mines, while it
also tends to break up and loosen hard scale
already formed and prevent further deposi-
tion. This is claimed to be done without
injury of any kind to the texture of the
boiler. Parties using water impregnated
with lime, magnesia, iron or their com-
pounds with sulphuric or carbonic acid, fre-
quently find difficulty in keeping up steam,
from the constant and rapid accumulation
on the boiler shell. It is claimed that a
regular small supply of the anti-incrustator
will remove all such difficulties, and the
testimony of many parties seems to bear out
the claim. Messrs. S. B. Briscoe & Co.,
Pottsville, Pa., are the manufacturers.

Cutlery.

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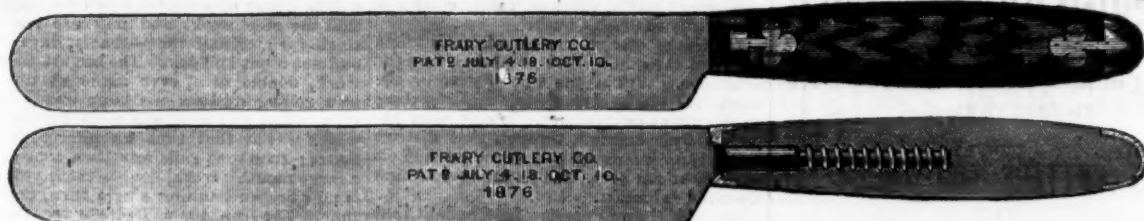
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There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle
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screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong
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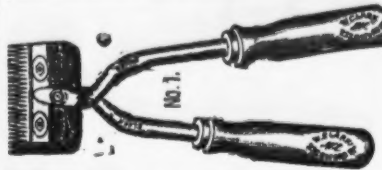
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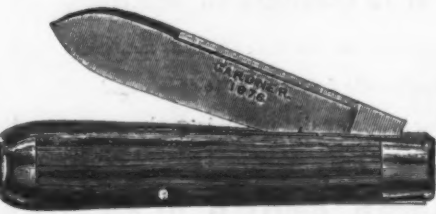
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The West-bound Freight Pool.

The representatives of the trunk lines of railway interested in the pool of west-bound freight held two conferences last week in the Windsor Hotel, New York. The gentlemen present at the meetings were: William H. Vanderbilt, president, William K. Vanderbilt, vice-president, and J. H. Rutter, general freight agent, of the New York Central Railway; Hugh J. Jewett, president, and Robert Harris, general manager, of the New York and Erie; Mr. Roberts, acting president, and A. J. Cassatt, vice-president, of the Pennsylvania Railroad; John W. Garrett, president, Robert Garrett, Milton Smith and Anderson Andrews, directors, of the Baltimore and Ohio; and Albert Fink, trunk-line commissioner under the pooling arrangement. The first conference began at 11 o'clock in the morning and lasted until 4 in the afternoon. Every topic of special interest to railway operators at the present time was discussed, but no decision was reached respecting any. The second conference was begun at 8 o'clock in the evening and was not terminated until after 11. When the meeting was over it was stated by Mr. Jewett, who had acted as chairman, that an agreement had been made to continue the west-bound freight pool for five years from Jan. 1, 1879. Commissioner Fink subsequently explained to the reporters that the terms of the pool had been changed in such a manner as to give him almost arbitrary power with respect to the allotment of percentages of freight to the railroads interested.

The pool now in operation is maintained by a contract between the companies, which allows 33 per cent. of freight to the New York Central, 33 to the Erie, 25 to the Pennsylvania and 9 to the Baltimore and Ohio. After January 1 the percentages will be defined by Commissioner Fink. If at any subsequent time one of the companies desires an increased percentage, it will be compelled to make application to the commissioner, presenting at the same time all the facts upon which its claim is based. The decision of the commissioner for or against the claim will be final, and can only be overturned by a dissolution of the pool. At the present time, if anything goes wrong in the opinion of members of the pool, the work of cutting freight rates is at once begun. Mr. Jewett and Commissioner Fink both said that under the new pooling system rate cutting could not be indulged in. They seemed at a loss to explain, however, how it can be prevented.

The matter of harmonizing action with respect of east-bound freight was also discussed at the conferences, and it was finally decided that the present tariff rates should be maintained by the trunk lines and their connections. It was admitted that the Western roads have been cutting rates, and an arrangement was entered into for compelling those corporations to give up squabbling. Another topic that was warmly discussed was the present warfare about passenger rates between the roads running east from St. Louis to join the trunk lines. No definite action was taken upon this matter. It was referred to the Committee on Rates, composed of Commissioner Fink, J. H. Rutter, of the New York Central; J. H. King, of the Baltimore and Ohio; A. J. Cassatt, of the Pennsylvania; and Robert Harris, of the New York and Erie.

Vulcanized Fiber.

One of the most striking instances of the rapid growth of a new industry is to be found in the recent application of vulcanized fiber to an almost limitless number of mechanical uses. Commencing a few years ago with a few experimental applications, it so quickly proved its value that its uses have multiplied almost daily, until at present it meets a wide demand from railroads in particular and manufacturers generally. It is composed of vegetable fiber, reduced to a pulp and so treated as to produce a high class of paper. It is then subjected to chemical treatment, whereby its properties are entirely changed, and a substance results possessing in an eminent degree the qualities of durability and strength. The treatment is regulated at will, so as to produce hard or flexible fiber, according to the requirements of its use. The hard is somewhat like horn in consistency, is very tough and strong, has remarkable durability under friction and remains permanently elastic under all ordinary conditions of weather and temperature. The flexible fiber closely resembles the best English sole leather in appearance, and is largely used as a substitute therefor in mechanical appliances, but is closer grained, more durable, and, being of uniform quality and thickness throughout, cuts without waste. It is largely used in place of rubber for packing. A valuable feature of this substance is its insolubility in hot or cold water, oil, naphtha, petroleum or alcohol, while it is but slightly affected by most acids, and is therefore claimed to be specially adapted for plumbers' washers, &c., car-box and carriage-axle washers, dust guards, oil-box covers, &c., for the following reasons:

It is not affected by oil or grease, does not absorb them or any other fluid except water, the only effect of which, hot or cold, is to cause it to expand and become elastic like leather. It will not stick to anything, and therefore never becomes fast in a faucet like rubber. The washers are said to outwear three or four leather or rubber ones, and always make a tight fit. They are claimed to be cheaper than any other.

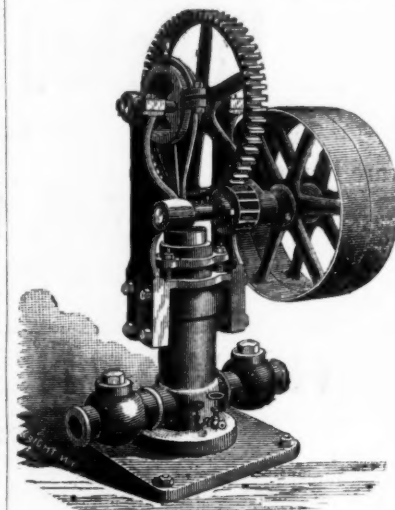
They are used as back straps or packing around car axles, where they enter the rear of the oil boxes to prevent the entry of dust and grit and the leakage of oil. Grit will not adhere to them, and they wear indefinitely. Another large demand comes for them as fish-bolt washers, as they are said to constitute a permanent elastic compensating cushion at the joints of the rails, thereby reducing vibrations and shocks, and also the wear on rails and rolling stock. At the same time it affords one of the cheapest lock-nut arrangements, as the washer sinks into the elliptical hole in the fish plate about 1-32 or 1-16 inch, which prevents turning, and by exposure to the weather the edges of the washer outside of the nut become swollen

and rough, and rising around the edges of the nut hold it firmly in place. This action takes place without any decay or deterioration of the material.

The flexible fiber is made in sheets 42 inches wide by 5 feet 6 inches long and of any desired thickness, from 1-32 inch to 9-16 inch. The sheets are usually halved (21 inches wide) for convenience in shipment. Some other uses to which the fiber is put are as follows: For packing the joints of condenser tubes where they make a tight joint, but permit expansion and contraction through the tube sheets; for journal bearings and bushings, as it has anti-friction properties and is said to outwear brass or Babbitt metal where there is high speed without too much weight, and it requires but half the lubrication; for gibs on engine cross heads, &c.; for electric insulators and in place of hard rubber, as it is much cheaper and superior in strength; for shoe tips, box toes, shanks, counters, heel stiffeners, insoles, &c.; for harness loops, saddles, martingales and napkin rings; trunks, valises, plate chests, &c., and for the carriers in which the messages are placed to be driven through the pneumatic tubes in London, an order for the same having been recently received here by the manufacturers, the Vulcanized Fiber Co., at their factory, Tenth and Walnut streets, Wilmington, Del. Heberton & Co., Walnut street, Philadelphia, are sole agents.

The "Economic" Boiler Feed Pump.

Mr. I. B. Davis, of Hartford, Conn., is making a new form of geared boiler feed pump, which he calls the "Economic." These pumps are made in three sizes, the smaller of which has a 3-inch plunger, and will deliver some 800 gallons of water per hour when working at its best rate of speed. The next size has a 4-inch plunger, and delivers 1200 gallons; while the larger size, which has a 6-inch plunger, will deliver 2000 gallons per hour. The highest speed at which these pumps should be run ought not, according to Mr. Davis, to exceed 40 strokes per minute. This gives ample time for the



valves to seat at the end of the stroke, and greatly reduces the shock of working against heavy pressures. Where the main engine from which power is obtained is economical, a geared pump is, without doubt, much less wasteful of power than any other method of pumping, and the saving possible by the use of a geared pump much greater than is usually supposed. The parts of the pump are all made interchangeable, and are designed not only to be durable but to be cheaply manufactured. Flanges on the side of the cylinder carry the framing for the gearing. The journals are all of steel, and the boxes Babbitted. The valves are arranged so that by taking out a cap they can readily be removed. The plunger is driven by an eccentric and connecting rod.

Steel Rails on Canadian Roads.—The climate of Canada is said to be especially trying to iron rails, so that before the introduction of steel rails the expense for the maintenance of permanent way on the Grand Trunk and Great Western Railways was enormous, and yet the result was eminently unsatisfactory, so much so indeed that when an eminent English railway man—Mr. J. Allport, of the Midland Company—went over the system he pronounced it the most wretched piece of permanent way which he had ever seen in the course of a very extensive experience. The London Mining Journal gives some valuable data illustrating the utility of steel rails in reducing the maintenance charges of the Great Western Railway of Canada. In the year ending July 31, 1874, the outlay for maintenance purposes on this system was £395 per mile; in the year ending July 31, 1875, £307 per mile; and in the year ending July 31, 1876, £232 per mile. It will be seen that there was a marked and progressive decline in the expenditure during the two latter years. But the reduction had not by any means acquired its full development. In the year ending July 31, 1877, the maintenance outlay made was only £193 per mile, and in the year ending July 31, 1878, it still stood at only £196 per mile. The great decrease effected in the expenditure on permanent way was rendered all the more remarkable by the fact that of late the outlay for sleepers has increased. This arises from the large number used and the higher price paid for them. This higher price is due to the growing scarcity of suitable timber in Canada, and to the greatly augmented demand for it, owing to the requirements of the numerous railways constructed in Canada within the last few years, as well as of those in course of establishment. This makes the reduction in the permanent way expenditure of the Great Western of Canada all the more satisfactory. The directors, we may add, report that although the cost of maintenance has been reduced, the condition of the permanent way continues excellent.

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AND
Metallurgical Review.

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Weekly Edition: \$4.50 a year. Issued every Thursday morning.

Semi-Monthly Edition: \$2.30 a year. Issued the First and Third Thursday of every month.

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ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

DAVID WILLIAMS, Publisher.
53 Reade Street, New York.

PITTSBURGH: J. D. WELLS, Manager and Associate Editor.

PHILADELPHIA: J. D. WELLS, Manager and Associate Editor.

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CONTENTS.

First Page.—The Ponsard Steel Furnace. The South Pacific R. R. Tunnel. A Famous Colonial Iron Works. Saltwater from Bolivia. Boiler Explosion in a Rolling Mill.

Third Page.—Petroleum as a Fuel at Sea. The Trade of Newcastle. Heat-Conducting Power of Rocks.

Fifth Page.—Mounted Vertical Engine. Improved Canadian Turbine. The Anthracite Interest.

Seventh Page.—The Davis Fire Escape.

Ninth Page.—The Condition of British Industry. A Large Steel Product. The "Black Star" Boiler Fluid.

Eleventh Page.—The West-bound Freight Pool. Vulcanized Fiber. The "Economic" Boiler Feed Pump. Steel Rails on Canadian Roads.

Thirteenth Page.—The Paris Exposition. Miners' Wages in the Scranton District.

Fifteenth Page.—Design Patents Again. Will Our Favorable Trade Balance Bear Analysis?

Seventeenth Page.—The Reduced Production of Tin Plates. The Pig Iron Industry. Labor and Wages in England.

Nineteenth Page.—New Publications. Can the Production of Pig Iron be Limited? Metallurgical Notes.

Twenty-first Page.—Plans for the Extension of American Commerce.

Twenty-third Page.—Trade Report. General Hardware. Iron, Metals, Old Metals, Paper Stock, etc. Exports. Imports. Coal.

Twenty-fifth Page.—Philadelphia. Pittsburgh. Chattanooga. Boston. Louisville. St. Louis. Cincinnati.

Twenty-seventh Page.—Richmond. Baltimore. Foreign. Our English Letter.

Twenty-ninth Page.—Industrial Items. Drawbacks on Damaged Imports. Reciprocal Free Trade. The Ownership of the Adams Nickel-Plating Company. Labor Notes.

Thirty-first Page.—The Iron Age Directory.

Thirty-third Page.—New York Wholesale Prices.

Thirty-fifth Page.—New York Wholesale Prices. (Continued).

Thirty-seventh Page.—Philadelphia. Buffalo. Chicago and Pittsburgh Hardware and Metal Prices.

Thirty-ninth Page.—Boston and St. Louis Hardware and Metal Prices.

The East River Bridge is in a bad way. The Board of Trustees have not been able to get together a quorum for three months. The receipts of the treasurer of the company last month amounted to only \$3921.36, most of which was for rents. The expenditures amounted to \$40,549.10. The cash remaining on hand is \$29,264.95. The existing liabilities are \$130,000, and these are daily increasing. The total receipts thus far have been \$10,106,251.60; of the total expenditures, \$10,076,956.65. Of the amount received Brooklyn has contributed \$6,878,956.67, and New York \$3,000,000. Laborers have been rapidly discharged within a few weeks past, and now work has been suspended for the winter on the masonry in Brooklyn, and the masonry on this end is being put into shape to protect it from the weather. There are about 150 men remaining in the employ of the bridge, and most of these are engaged in wrapping the cables. Unless the legislature shall do something to relieve the Board of their present financial embarrassments, the work will have to be abandoned for the time.

Design Patents Again.

The decision of Judge Blatchford, denying the application of Perry & Co. for a preliminary injunction restraining the further manufacture and sale of two base burners said to infringe the "Argand" design patent, is of much importance to all classes of manufacturers. As in our article of October 31st, on Judge Wheeler's decision affecting the "Hecla," we shall consider Judge Blatchford's ruling only in its bearings as a legal precedent. With the merits of the case to which Judge Blatchford gave hearing, we shall try to concern ourselves as little as possible.

It will be remembered that Judge Wheeler, in the decision rendered by him some weeks ago, and upon which the injunction affecting the "Hecla" was granted, took broad and advanced ground in interpreting the law of design patents. He held, in effect, that a design was a novel combination of shape, form and general configuration—an arrangement of parts which gave an original character to the article of manufacture, and which, taken together, constitute its identity. His specific ruling was as follows: "Whenever a valid patent for a design is granted, any unauthorized article which, by reason of its resemblance in external appearance to the patented design, is calculated to deprive the patentee of any part of that market which the patent was intended to secure to him exclusively, is an unlawful invasion of his rights." This ruling, so far as we can learn, was acceptable to both parties. It gave a definite value to a design patent, and not a few of the leading members of the Anti-Clinker Association expressed themselves as gratified that the law had been so clearly defined. "If this be the law," said a leading manufacturer of stoves, "it suits us perfectly. We know now just where we stand, and what our design patents are worth. It shows us that we have some rights which are valuable in the fruits of our skill and industry, and which we can enforce." This, we believe, was the sentiment of the trade at large.

Judge Blatchford's decision on the application for an injunction against other stoves alleged to infringe the "Argand" design patent, reopens the whole question, and makes the value of a design patent as much a matter of uncertainty as it was before Judge Wheeler rendered his opinion. This is not so much because he decided that, in the case of the two stoves named by the complainants, there was not enough resemblance to the "Argand" to constitute an infringement, as because of the ground upon which his opinion was based. Noting certain differences in ornamentation, illumination and minor differences of construction, he held that these differences were so evident that the most casual observer "outside of a lunatic asylum" would never mistake the one for the other. Testimony undertaken to show that the essential features, shape, form and configuration of the "Argand" stove was common to both the stoves named by the complainants, seems to have had no weight with the court. The differences which attracted the eye and served to distinguish one from the other when placed side by side, appear to have been the only points considered; and the decision was rendered in strict accordance with the letter of the decision of the Supreme Court in the Gorham case, although Judge Blatchford seems to have had a less accurate conception of its spirit and logical results than was shown by Judge Wheeler.

Now, we do not undertake to express any opinion as to whether the two stoves named by the complainants do or do not infringe the "Argand;" but do say without hesitation that the grounds upon which Judge Blatchford decided that they do not infringe are unsatisfactory, and that his decision, whether it be deemed just or unjust, destroys entirely the value of design patents and annihilates all the benefits which we hoped would result from Judge Wheeler's decision. Had Judge Blatchford, after a careful examination of the stoves, drawings and photographs entered as exhibits by the opposing counsel, decided that there were differences between the "Argand" and the alleged infringing stoves which involved radical changes of form, outline, configuration and general character, we should have accepted it as satisfactory. But as we understand the decision, it was given on the ground that there were such differences in the appearance of the stoves in question as would be apparent to the casual observer; consequently, as one would not be mistaken for the other or the patterns for one could not be used in the production of the other, there was no infringement. Every manufacturer knows that, with as large a liberty as this to imitators, a design patent has no value further than to prevent such close copying that the imitation shall be mistaken for the original by ordinary observers. The plates of a stove covered by a design patent could not be used to cast another stove, nor an ornamental casting be reproduced literally without infringement; but, according to Judge Blatchford's ruling, an idea may be copied in all its essential features, or a design be boldly pirated, provided care is taken to introduce such minor changes as shall be distinguishable upon comparison.

We have followed the progress of these suits with great interest, not because we have any concern as to which side shall win, but because we recognized the fact that the decisions rendered must be fraught with momentous consequences to American industry, perhaps for years to come. The magnitude of the interests involved, the exceptional ability of the counsel employed, the voluminous and exhaustive character of the testimony taken, and the attention they were entitled to claim in the courts, made them causes célèbres, and called for decisions which would long be quoted as precedents. That Judge Blatchford decided the case heard by him so hastily and on grounds so unsatisfactory, cannot but be regretted even by the defendants. Had he reached the same conclusions on broader, more comprehensive and more logical grounds, even those who differed from him would have been satisfied; as it is, the satisfaction of the defendants must be qualified by the knowledge that, by reason of Judge Blatchford's decision, they have lost something of substantial and real value which Judge Wheeler's decision gave them.

It is but natural that in cases involving large interests there should be bitter feeling, and that both contestants should be willing to sacrifice a principle for the sake of a favorable decision. Is it not practicable and desirable, in view of the immense importance of securing a broad, liberal and comprehensive interpretation of the law of design patents, from which there can be no appeal and which shall simplify or avert future litigation, for the parties in interest to make a test case which can be tried without feeling and appealed to the Supreme Court at once by arrangement between counsel? There is not a manufacturer in the country who makes goods which can be covered by design patents who is not vitally interested in knowing what a design patent is and what constitutes an infringement. Our industrial progress demands increased skill in our designers, and the brain labor which gives us new designs is as much in need of protection against unlicensed piracy as the mechanical talent which gives us telephones and improvements in steam engines—more, indeed, for while we lead the world in mechanical progress, we are barely beginning our career as a nation of art workers, and our only hope for success in this direction is to give the artist as much protection as is given to the inventor in any other field of study and labor.

Will Our Favorable Trade Balance Bear Analysis?

The real significance of the large balance of trade in our favor is not to be found in the totals, however gratifying to our pride it may be to know that \$257,786,964 represents the excess of net exports over net imports of merchandise for the fiscal year 1877-8. The meaning of this balance cannot be determined by a sum in subtraction. It can be known only by a patient study of details. There are balances that seem favorable, but investigation shows them to be evidences of poverty and decay. If the details of our exports and imports show that this balance has come from a decline in imports, and of such imports as indicate that we have been compelled to retrench even in our comforts, it certainly is not a source of gratification, as it proves a state of affairs that is anything but satisfactory. On the other hand, if we find these items holding their own, and at the same time find a decline in the imports of certain manufactured articles produced in this country and an increase in the export of other articles either manufactured or produced here, it would be a most gratifying indication.

In analyzing our imports and exports it is well to take a group of years, to avoid errors from deficient crops and stocks on hand, and to give a fair range of prices we have taken the fiscal years 1871-73 and 1876-78. The first group shows the three years immediately before the panic, and the last the triennial just closed. Our total net exports and imports of merchandise for these years are as follows:

	Total Net Imports of Merchandise	Total Net Exports of Dom. Goods
1871.....	\$505,802,414	\$428,398,903
1872.....	\$510,904,622	\$428,487,131
1873.....	\$524,659,777	\$525,033,439
Total.....	\$1,541,366,813	\$1,381,919,473
1876.....	\$445,938,766	\$521,682,347
1877.....	\$438,518,130	\$520,670,224
1878.....	\$422,895,834	\$520,683,798
Total.....	\$1,307,352,730	\$1,563,036,369

In these triennials it will be noticed that the totals of imports and exports have about changed places. The imports have decreased 26.15 per cent. and the exports increased 35.61 per cent. Instead of the imports being 26.45 per cent. in excess of the exports, the latter in the last triennial are 26.27 per cent. in excess of the former.

The two imports that come nearest to being necessities of life are tea and coffee, and if our imports have fallen off from poverty it should show in these. Taking the imports for the corresponding years, for which we have given the totals, we have the following:

	Pounds.	Coffee.	Value.	Pounds.	Tea.	Value.
1871.....	377,022,243	\$39,029,859	\$17,454,617	1871.....	87,454,617	\$17,454,617
1872.....	298,805,946	\$30,419,323	\$14,811,003	1872.....	70,479,270	\$14,811,003
1873.....	293,207,271	\$30,419,323	\$14,811,003	1873.....	69,214,324	\$14,811,003
Total.....	968,035,460	\$99,858,405	\$47,076,623	Total.....	227,148,111	\$47,076,623
1876.....	330,769,246	\$34,788,227	\$16,827,153	1876.....	10,524,166	\$16,827,153
1877.....	331,630,723	\$34,788,227	\$16,827,153	1877.....	10,524,166	\$16,827,153
1878.....	309,882,540	\$31,914,603	\$15,366,704	1878.....	15,660,158	\$15,366,704
Total.....	972,282,509	\$97,490,957	\$48,614,026	Total.....	36,708,490	\$48,614,026

Considering the increase in population, it will be observed that the consumption of these articles has not fallen off. An exam-

ination of the imports of such articles as cocoa, sugar and spices—luxuries in one sense—will lead to the same results if we consider the circumstances, especially in reference to the last two articles. Our sugar crop has largely increased in Louisiana, and the maple-sugar crop has been constantly growing. Our imports of tin—an article not produced in this country to any appreciable extent, one which enters into consumption in every household and in which some economy must be exercised—have increased in these years nearly one-fourth. The great reduction in price may have something to do with this, but even allowing for this, the imports have largely increased. In a word, while our total imports have fallen off nearly 27 per cent., these articles have increased, or at least held their own. This certainly shows that the balance of trade is not due to such poverty among our people as to prevent their indulgence in the luxuries that come from abroad and that cannot be procured here.

If we compare our exports and imports of certain articles manufactured in this country, we shall be still more impressed with the idea that this large balance to our credit is really favorable. Take cotton goods for example. In the first triennial, 1871-73, we imported in round numbers \$83,000,000, and in the same time exported \$8,500,000. In the last triennial we imported only \$47,500,000 and exported \$29,000,000, a decrease of more than 40 per cent. in imports, and an increase of more than 300 per cent. in exports. Our exports of leather and all manufactures of the same have increased from \$10,500,000 to \$26,000,000, while our imports have fallen from \$35,000,000 to \$24,000,000, comparing the periods indicated. The importation of lead in pigs and bars has declined from \$10,250,000 to less than \$1,500,000. We could add to these figures many others, but we have shown enough to prove that our favorable trade balance is to be looked upon with gratification rather than distrust.

The Reduced Production of Tin Plates.

The course of trade in tin plates has been so unsatisfactory during the past few years both to the maker and importer, and especially during 1878, that producers have on various occasions endeavored to arrive at some arrangement curtailing the output. They have usually endeavored to induce all the makers, large and small, to join the movement, and sought to tie each other by heavy penalties; but these measures have in every instance proved futile, either because of the bad faith of some or the subsequent financial necessities of others, who have preferred to turn out as many tin plates as possible, even at a loss, in order to obtain some advances in money. Under these circumstances the makers seriously bent on placing matters upon a sounder basis were disgusted and discouraged. Toward the close of September last a different plan was adopted. A number of makers in Wales came to a resolution to reduce the output one-third, amounting to 15,000 boxes per week, without trying to draw into the agreement every producer in the region. We now hear that the movement, which has practically proved to be well timed, will be joined by the remaining manufacturers.

Fortunately the general prospect of the tin-plate trade is an improving one, altogether abstracting from this concerted curtailment of production. It is so particularly in this country, the greatest consumer. While, therefore, the makers keep their output within bounds, consumption has begun gradually to expand, stimulated by the moderate cost of the article. The following table shows the export from Great Britain to the United States at the end of seven, eight, nine and ten months:

	Tons.	Tons.
7 months. 1878.....	69,476	1878..... 69,755
8 months. 1877.....	61,857	1877..... 70,479
9 months. 1876.....	59,235	1876..... 59,214
10 months. 1875.....	76,525	1875..... 87,782
11 months. 1874.....	78,370	1874..... 88,342
12 months. 1873.....	67,325	1873..... 74,578

These figures show that the increase of exportation this way since midsummer has been no greater than in previous years, whereas the production of certain articles which are canned to a considerable extent both for domestic consumption and export, has increased as much as 50 per cent. in the meantime. Lard, for instance, is so cheap at present that, even when put up in tins, it can drive out of the warm climates with ease its main competitor, olive oil, for frying purposes. The trade in petroleum in tins to India and Spanish America has assumed colossal proportions within the past few years, by reason of its cheapness and popularity; and this article cannot be put up safely in any other sort of packing if intended for warm climates. Even in temperate climates like Southern Europe tins are now preferred, and are superseding the objectionable barrels. Besides lard and petroleum we have an endless variety of goods, such as oysters, beef, fruit and preserves, demanding tin for a packing, not only for export, but for the enormous inter-State trade across the continent. With our abundant crops this consumption has been steadily increasing, and whatever falling off there may have been in the building trade during the past five years, we feel convinced that this increase has more than made up for it. The full measure of tin plate consumption has therefore been kept up in the United States. The light stocks now held in the

ports and in the interior prove it, and tin plates could hardly have declined to their present low value if other countries had absorbed them as steadily, and if makers had been guided more by the deficient absorption in countries outside of the United States, instead of always expecting us to come to the rescue of their excessive output.

The mistake into which people abroad dealing largely with us continually fall, is that they overestimate our capacities of consumption and think we are bound at all times to absorb that which other countries do not take at any one time. This mistake has cost Western Europe more money during the past five years than any other miscalculation in industrial and commercial matters. It is now to be expected, however, that by next spring other tin plate consuming countries will be larger customers should peace be preserved, and that makers may then have every inducement to resume production in full.

The Pig Iron Industry.

The communication which we print on another page over the familiar initials W. H. A., merits careful reading. We are glad to give it place in our columns, and shall be pleased to hear from others on the subject it discusses. If we express the belief that such an organization of the trade as our correspondent proposes is impracticable, it is not because we do not recognize the deplorable condition of the pig iron industry nor the advantages of a restricted production. The article on "The Reduced Production of Tin Plates," in another column, will be found to contain some facts which are suggestive if thoughtfully considered. In an industry like that of iron making, manufacturers are not likely to consider the common good longer than self-interest impels them to do so. Even in the Lehigh Valley there are those who feel that the race is to the swift and the battle to the strong, and that a policy which should temporarily avert disaster from those who would otherwise go under, if any are thus weak, would not be attended with permanent benefit to the trade.

Judging from what our correspondent says about the needs of the trade as regards its representation in the newspaper press, we fear he has no very clear idea of the functions and purposes of a trade journal. We do not consider it our duty to urge upon the ironmasters of the country a policy which we have no reason to suppose they are prepared to consider favorably, or able to carry out should they adopt it. At the same time our columns are open for the fullest and freest discussion, and if, as the result of such discussion, a plan should be adopted which would meet the requirements of the trade and the favor of those in it, it will be time enough for us to advocate it. We have yet to be convinced, however, that any plan of organization is practicable which seeks to regulate production. The experiment has failed many times in the coal trade, and will probably fail again in a few weeks. In our judgment the best and only practicable solution of the difficulties which beset the iron trade will be found when every furnace proprietor shall regulate his operations in accordance with an intelligent regard for his individual interests. Those who cannot make iron without loss would do well to stop. If they are incurring losses at the expense of their creditors, their policy of management is utterly dishonest and can only end in disaster; if they can make iron without loss or at a profit, they will probably continue to do so without regard to the wishes or interest of those who cannot.

Labor and Wages in England.

British imports, after increasing for a long time, have at last taken a turn and begun to decline, having fallen off in value during October nearly one-fifth as compared with last year. This is owing in part to the decline in the price of breadstuffs and raw materials. The exports still continue to decline, as they have for some years past, and the outlook for foreign trade is decidedly gloomy. England's competitors are not only pushing her on every side, but in her own markets. The decline in imports, however, is an indication of a diminution of the adverse balance of trade.

From nearly all parts of England come evidences of most appalling distress and destitution among the workpeople in the skilled trades. The manufacturers have hitherto been able to give some employment, though at reduced wages, but the constant decrease in exports has made this impossible in some trades, and notices of reductions, coupled with short time, come in almost every mail. At Sheffield the destitution among the mechanics and laborers is said to be very great. The strikes among the cotton operatives in the North of England have entailed much sickness and distress, and the same is true among the Clyde shipbuilders. At Sheffield, iron workers' wages have been reduced 17½ per cent. this year. In the North of England, North Staffordshire and other points wages have been reduced to correspond with the reduction in South Staffordshire, and from all districts comes the same story. Puddling is now 7½ per ton of 2400 lbs. in South Staffordshire.

With the early prospect of protection before them the Canadians are making efforts to utilize their mineral wealth. The *National* of Toronto has a somewhat incoherent ar-

ticle on the subject, in which it is claimed that the Canadian hematites and magnetites could be profitably smelted with American anthracite, Nova Scotia coke or Canadian charcoal, and that instead of importing, as in the year 1877-'78, \$245,124 worth of wire, \$1,456,409 worth of machinery, general hardware, cutlery, &c., a protective tariff might foster a great industry in producing them at home. It is stated that already new life is given to iron interests; that the Ottawa Iron Works are bestirring themselves and adding fresh capital for commencing operations; that Port Hope is applying for a charter to erect blast furnaces, and that the rolling mills at Hamilton will soon be in order. Whether our neighbors will be successful under present conditions time will soon show, but we fear that they are deceiving themselves when they make such statements as the one that 50 per cent. magnetite can be laid down at Toronto at \$2 a ton.

The unparalleled depression of the iron industry in England is causing a searching inquiry into its causes. Thus, we find the large corporations, railways, &c., as well as the government arraigned for the establishment of manufactories of supplies. It is argued with much force that even if an economy is the result of a successful attempt on the part of railroads to make their own pig and roll their own rails, tiers, &c., the wisdom of adding to the responsibilities of the management is questionable. It is stated with confidence that the effect is often positively disastrous; that the cost price is beyond that of the price in the open market; that through fear of allowing plant and machinery to remain idle supplies are manufactured for which there is no immediate or even prospective demand, and that the system leads to loss by a number of superfluous odd jobs and premature renewals. There are many instances in which these causes and the insufficient or improper management of such accessory manufacturing establishments do much harm, in two ways: They injure the interest of the shareholders, and they introduce a peculiar element of competition into a trade, which, if left to its own regulating influences, would be able to furnish supplies at a lower rate with reasonable profits to private enterprise.

In a recent speech in the House of Commons Lord Beaconsfield spoke as follows with reference to the business outlook: "The recent words of the President of the United States, coming from such a quarter on such a subject, cannot be treated with too much consideration. Enterprise in America reacts on that of England. I look forward with much confidence to the influence of American industry and enterprise shortly producing more favorable results than we can now estimate." These are strange words for a Tory Premier to utter in Parliament. Mr. Gladstone entertains these sentiments we are sure, but we should have supposed that would be just the reason why Lord Beaconsfield should have thought otherwise, or at least have spoken otherwise.

NEW PUBLICATIONS.

OUTLINE OF THE GEOLOGY OF ALABAMA. By Eugene A. Smith, Ph. D., State Geologist.

The geological structure of the State of Alabama has been the subject of much earnest and persistent research since the year 1847, when Prof. Tuomey began his first systematic examination, which was continued after his death by Prof. Mallett. After the war Prof. Eugene A. Smith continued the field work and the publication of reports, the result of his labors since 1873 being three annual reports of progress. The work before us was written for, and is embodied in, Berney's Hand-book of Alabama. Prof. Smith has succeeded admirably in presenting a clear sketch of the geological structure of the State, which an introductory chapter of general explanation of technical terms will make accessible to all. Geologically, Alabama may be divided into three tolerably well-defined divisions—the Northern, Middle and Southern. The chief formations constituting the soil of the State besides the metamorphic region are the silurian and devonian, the subcarboniferous, the coal measures, the cretaceous, tertiary and more recent deposits. The resources of the metamorphic region seem to be but little explored beyond a few gold mines and numerous indications of manganese ores, magnetites, hematites and limonites. It is in the silurian deposits, the Knox shales and dolomites that the inexhaustible beds of limonites of Calhoun, Talladega and Shelby counties are found. The same ore is also abundant in the lower portions of the territory which covers the southern portion of the State. The coal measures of Alabama extend over an area exceeding 7000 square miles, which constitute three fields, called the Warrior, Cahaba and the Coosa, after the streams which drain them. The two latter are separated from the former by a series of anti-clinal silurian valleys. The Warrior field contains 40 seams of coal from 1 inch to 6½ feet in thickness, of which 16 are considered workable, being over 2 feet in thickness. Three or four of these, the New-castle, Morris, Black Creek and Pierce beds are being worked, the Black Creek furnishing excellent gas coal. The Cahaba field has 16 workable seams, of which some yield good steam coal while others coke well. As yet the Cahaba, Wadsworth, Buck, Black Shale, Beaver Dam and Helena seams only have been worked to a limited extent. But very little is known of the Coosa field, beyond the fact that there are at least three beds of coal of workable thickness. As far as surface indications and limited developments can justify statements as to the mineral resources of a region, the northern and middle portions of the State of Alabama are abundantly endowed by nature and possess

all the materials upon which a prosperous industry may be built up. Much can be learned from the work before us on the subject of the resources alluded to, and it will be a welcome addition to all to find the main geological configuration of the State laid down in a finely executed map.

Can the Production of Pig Iron be Limited?

To the Editor of The Iron Age: In your last issue you copy from the Iron and Steel Association Bulletin an article urging the need of some immediate action to relieve the present wretched condition of the pig iron market and its producers, the outline of which is as follows:

"It provided for, 1. A general board of control, composed of representatives from all the pig iron regions, as grouped in the published list of the American Iron and Steel Association; the Lehigh region constituting one, the Schuylkill another, and so on. 2. A local board for each region. 3. The producers of each region to be bound to limit the production to the legitimate demand. 4. When the output in any region exceeded the sales for a given period, the producer making the most iron to his aggregate capacity to first put out a furnace. 5. A reasonable modification in favor of those producers having only one furnace."

You remark regarding this as follows: "We are not prepared to discuss the scheme [for limiting the production of pig iron] without a clearer idea of how it is proposed to form a combination of producers which shall outlast the temptation to take advantage of the first advance in price and make iron without reference to the orders of the Board of Control."

Self-interest would prevent any such violation of the pledge of membership, even if their pledged honor and obligation of such membership could not be relied on; but with men occupying stations as important as those who control and manage our great iron works there ought to be no apprehension on this point. I feel assured that in the Lehigh region every producer who would sign the pledge of membership would loyally adhere to all its requirements for and during the time agreed upon. The deplorable condition of the market for the past several years, with no visible signs of improvement, should of itself be a sufficient restraint to prevent any action tending to defeat the maintenance of prices at living figures. There would, however, be several methods available for imposing such penalties as might be approved. This is a matter of detail, and each region would best know its own members and could impose such additional obligation as might be thought necessary. But the most important question is, What would be the effect of the acceptance and adoption of the plan? If it would not be remedial and mutually advantageous, it would be useless. If it would work advantageously, self-interest would assure its maintenance for at least a stipulated time. In order to examine its probable effect, let us suppose the acceptance and organization complete. What would result? The fourth item of the plan provides that when the output in any region exceeds the sales for a given period the producer making the most iron in proportion to his aggregate capacity shall first put out a furnace. The productive capacity of the several furnaces is known and published from year to year. The quantity of iron sold from month to month is readily ascertained, so that when more iron is made than is sold the local board of control would have accurate and reliable knowledge of it. Now, is it not reasonable to suppose that any producer would refuse to sell his product for less than actual cost when assured, as he would be with such an organization, that a restricted output was certain to bring him at least cost for his iron within a few months at furthest? It is believed that the simple completion of such an organization would immediately restore prices to actual cost of production. The present ruinous condition of the market does not increase consumption or benefit consumers. As much iron would be used at an average of \$18 per ton at the works as is now used at an average of \$15 per ton. Consumers would have no occasion to fear an advance beyond a reasonable price, for whenever the sales for a given period exceeded production the producer making the least iron to his aggregate capacity would be entitled to put in a furnace; the incentive to blow in great production would be kept full up to consumption. And I may say here that the scheme cannot be regarded as one for extracting profits from the making of pig iron, but simply a means of preventing serious, and in many cases ruinous, losses. The present cost of a ton of pig iron in the Lehigh region (and it is doubtful if it can be made for less in any competing region) is from \$18 to \$19, allowing interest on the amount of capital now required to build, equip and run a furnace, and an amount sufficient to relieve it and replace the boilers, hot-blast engines and other equipments when worn out. Without an allowance for interest as above the actual average cost is from \$17 to \$18 per ton on the furnace bank. The monthly business statements may show net cost at \$15.50 to \$16.50, but in this there is no allowance for relining the furnace, replacing worn-out hot-blast engines, engines, boilers; reasonable percentage for losses, &c., or for interest on capital employed, which are as properly elements of cost as are coal, ore, &c. When I speak of average cost I include white, mottled, gray forge and Nos. 1 and 2 foundry. These grades of iron are now being sold at an average of \$14 to \$15 at works, and the price has so ruled for a year or more. Or, stated in other words, No. 1 has been selling at the works from \$16 to \$16.50; No. 2 at \$15 to \$15.50; gray forge, \$14 to \$14.50; mottled, \$13.50 to \$14, and white, \$13 to \$13.50, and in special instances at still lower figures where the need to realize was pressing. To these prices add about \$1.50 for freight, handling, &c., for delivery in New York and Philadelphia. This statement is sufficient to show the extreme urgency of the situation, and unless relief be had there is danger that the larger part of the capital invested in these great industrial works may be sunk if they continue producing at

these rates, for it is impossible to materially further reduce cost. To those who are unacquainted with blast furnaces and the making of pig iron, the question will be asked, Why, then, continue to produce? The answer is, there are many reasons known and understood only by those acquainted with the business, but independent of these reasons many producers have preferred to suffer loss and retain their custom rather than stop and allow rivals to secure their trade, hoping and trusting in the meanwhile that time would soon bring about a change for the better.

What the pig iron interest needs and has needed is an able and intelligent journal to lead the way, to discuss the necessities of the situation and point out the remedy which may offer the best hope for relief. This great interest, embracing an invested capital of many millions of dollars, is absolutely without an organization and without a journal to advocate or present for consideration a means of relief.

The suspension of the Allentown Iron Company has resulted from no bad management, other than selling iron to-day and paying more for it themselves in the cost of producing it to-morrow. As they kept in operation all their five furnaces they made more iron and sustained in consequence heavier losses than any of their neighbors, and were sooner pushed to the wall. It was said by one of the principal managers of the largest producers in this region: "All must follow the same road unless some relief comes in better prices." Those who have stood idle much of the time since the panic, or were out of debt and had a surplus in reserve, will no doubt "weather the storm," if it does not last too long, but will suffer damages more or less severe according to its duration.

And why should not your great journal take up the subject, discuss it, invite others to do so, and try to save this great industry from the threatened ruin which now overhangs it. Its destruction will almost fatally impede the development of the great natural resources of our country. It will be many years before capital will venture in similar investments. Any successful efforts put forth therefore to save it from ruin will be a substantial benefit to the future growth and prosperity of the country, in addition to affording the immediate relief so much needed by all producers of pig iron.

Many journals came nobly forward in support of the need of some arrangement to restrict the output of coal, and it is now everywhere recognized that it was an absolute necessity to save that interest from ruin. Yet it is doubtful if that interest was in as bad a condition at any time as is the manufacture of pig iron now.

If you will lead the way others will follow, and especially the journals in the iron producing regions who are more immediately interested.

W. H. A.

Metallurgical Notes.

THE TREATMENT OF MIXED GALENA AND BLENDE.

We are indebted to Messrs. Jos. Binon, of Stolberg, and A. Grandfils, manager of the Membrech works, for a copy of their pamphlet "On the Improvement of the Processes of Manufacturing Zinc" (*Etude sur l'amélioration des procédés de fabrication du zinc*), in which they point out the difficulty, or rather impossibility, of utilizing by present methods a class of ores which seems to be growing more and more common, the close and intimate mixtures of blende and galena. They review former attempts to treat zinc in the blast furnace, among them the early trials of Muller and Lencanzech, which were complete failures, and the later one by Clerc, which the authors also condemn, and then they proceed to demolish unnecessarily the patent process of Mr. Farnham Maxwell, who precipitates lead with the somewhat more expensive zinc. After some preliminary experiments, Messrs. Binon & Grandfils came to the conclusion that it would be best to use vertical retorts, set into a rectangular furnace so placed on pillars that it would be easy to get at the bottom of the distilling vessels, which are heated externally, as usual. The bottom and top arches of the furnace are pierced with round openings corresponding to the size of the retorts, which are preferably made oval in section. Cast-iron boxes form the bottom of the retorts, while the top is connected with condensing tubes which are located in niches made in the long walls of the furnace. Their thickness is increased at the back or in front by placing a back and front plate of refractory material, which leaves between them and two little vertical walls by which they are bounded a niche in which the temperature can always be so moderated as to prevent the volatilization of the zinc reduced. Messrs. Binon & Grandfils' method seems, therefore, to be a modification of the old Cornishian and English processes.

COMPARISON OF THE RUNNING-OUT FIRE AND HEARTH REFINING.

In the common running-out fires the pig iron is melted in contact with the fuel, and even if substances rich in oxidized iron are added to it, it is certain that the purification from phosphorus can never in this way be complete; but when it is considered that the Lancashire hearth refining eliminates phosphorus to a very inconsiderable degree, it is surprising that the common running-out process can take away so much phosphorus as it does. The reason, however, lies in the following two differences between hearth refining and the running-out process: 1. In the former the phosphorus, which has been taken up by the cinder as a salt of phosphoric acid, comes into simultaneous contact with carbon and more or less decarburized iron, and it is a fact which is proved by several circumstances that the affinity of iron for phosphorus and many other metalloids is greater in proportion as it is purer and more refined. In the running-out fire, on the contrary, the pig iron is never decarburized in any noteworthy degree, and it therefore never acquires so strong a disposition to reduce the phosphorus out of the cinder and again enter into combination with it. In the running-out fire, too, the fused iron in general does not come into simultaneous contact with the cinder

and carbon, but a cinder bath is interposed between the fused iron and the carbon; while, on the contrary, the iron during the operations in the refining hearth comes into simultaneous contact with the cinder and carbon, so that the phosphorus is reduced and re-enters the iron. 2. In the refining hearth the iron is subjected during the latter part of the process to a higher temperature than is the case in the running-out fire. The running-out fire process has been exceptionally carried on in a reverberatory furnace without contact with the fuel, and as the purification from phosphorus which takes place in the puddling furnace is so much more complete than that which is accomplished in the Lancashire refining hearth, it might well have been supposed that a reverberatory furnace would be distinguished in the same way in comparison with a common running-out fire. As reverberatory furnaces have been arranged, this, however, has scarcely been the case; and the reason of this is not difficult to find when it is considered that such furnaces have been lined with sand or masses of quartz, which prevent the cinder from being sufficiently basic or rich in oxidized iron; and it should never be forgotten that if any considerable elimination of phosphorus is to be brought about the cinder must always be kept so basic that the silica is well saturated, and thus has not too strong a disposition to liberate the phosphoric acid from the cinder, because if once separated it is reduced and enters into combination with the iron as phosphorus.

TRANSMISSION OF HEAT BY STEEL AND IRON PLATES.

In a letter addressed by Mr. John Collins to *Engineering*, that gentleman gives the following data derived from experiments made to ascertain the relative heat conductivity of iron and steel plates. The apparatus consisted of exactly similar plates of steel or iron 11½ square, .23 in. thick, supported on glass legs, heated by a Bunsen burner consuming equal quantities of gas, maintained at 2 inch pressure constantly; and a basin 3 in. in diameter placed in the center of the plate, containing mercury in which a delicate thermometer was immersed. The temperature of the mercury was then raised from 20° C. to 160° C., and relative times noted. The average gain in time of steel over iron plates of equal thickness is 13 per cent. When the relative thickness of the plates as used in boiler building is taken, this gives an average gain of about 20 per cent. In steam boiler trials, where boilers are similar in all respects, say thickness and material, the actual gain in working 20 days of 12 hours each shows actual evaporative power of 20 per cent. in favor of steel. In another series of a similar nature by Stuckentholtz, the results gave 19.6 per cent. and 20.8 per cent. in favor of steel.

SIEMENS-MARTIN AND BESSEMER STEEL.

Prof. R. Akerman, in his paper on the recent advances in the manufacture of iron and steel, read before the Iron and Steel Institute, makes the following statement in regard to the applicability of Siemens-Martin and Bessemer steel: The Siemens-Martin steel lends itself more readily than the Bessemer process to the production of large and heavy pieces, inasmuch as there is naturally much less difficulty in simultaneously melting in several large Siemens furnaces, for which no blast is required, than in blowing in at the same time several Bessemer converters. This is also the reason why the Compagnie des Forges et Acieries de la Marine et des Chemins de Fer, which uses Bessemer metal for its smaller cannon, makes the larger of open-hearth metal. The largest ingot which is to be found in the Exhibition was probably, from the cause just named, made by the Siemens-Martin process. For Creusot shows in its splendid and well-filled Exhibition pavilion a representation in natural size of an ingot made in this way weighing 120,000 kilograms. The largest actual ingot which is shown is also made by the same process, and is to be seen in the no less beautiful exhibit of the above-named Compagnie des Forges et Acieries de la Marine.

GASEOUS FUEL FOR METALLURGICAL PURPOSES.

Although in the beginning of this century the German metallurgist Lampadius recommended the use of the gaseous products of charring, and although the similarly constituted waste gases of the blast furnace were first used in 1814 by Aubertot, it was not until 1839 that Bischof, of Magdeburg, introduced the utilization of gas as a fuel. Especially after the invention of Lundin's condenser it seemed that the conversion of fuel into gas was a good means only for the utilization of inferior grades of fuel, until the introduction of the regenerative system by Siemens assigned to gas an almost unopposed position in the production of the highest temperatures. Progress in the construction of generators or gas producers proper, and the use of their product seemed to cease, or at least became uncertain; it was limited to elaboration of details, to heating the gases and the air of combustion and to more perfect methods of their mixture. But vital points, such as the accurate measurement of the relative supply of air and gas, were either left unheeded or not realized in practice. True, Nehse drew attention to the fact that the chief advantage of generator firing when compared with solid fuel was the possibility of a correct apportionment of the amounts of air to fuel, but not one constructor went beyond the adoption of the uncertain regulating action of valves, until quite recently Mr. J. Henderson proposed to supply air for the gasification and for the combustion by two distinct blowers running at speeds proportionate to the accurate amounts required. While the advantages realized by the use of gaseous fuel were conceded; while the regenerative system extended its range in all industries, calling for the economical production of high temperatures; while in puddling decided fuel economy was repeatedly established; while in the metallurgy of zinc the Boetius and other furnaces were gaining ground, and inferior fuels, such as peat, sawdust and lignite became useful even in the generation of intense flames, a widespread misconception, based solely on theoretical considerations, held undisturbed away with many metallurgists, and led them to reject the use of gaseous

fuels as wasteful. This conviction was based on the theoretical researches of Bunsen and others, that by converting carbon first into carbonic oxide and then into carbonic acid, there is a loss of heat which Krans and Chadeffaud estimate at 30 per cent. Theoretically this cannot be doubted, but when the true criterion, the actual effect in practice is considered, it will be found that gaseous fuel is more economical. The most serious objection to generator gases has been the large volume of nitrogen which they contain, and which, as it acts as a dilutant, is injurious in many respects. How seriously the presence of a large body of nitrogen is, may be inferred from the fact that according to analyses by Knapp, by Feller and others, the percentage of that element amounts to from 60 to 65 per cent. by volume, and 55 to 65 per cent. by weight of the total of the generator gas. Recently a new process has come to the notice of metallurgists, which bids fair to render to gaseous fuel for metallurgical purposes that supremacy which the convenience of its use deserves. We refer to the Strong water gas, the mode of production of which was fully given in a former issue of *The Iron Age*. Water gas, it is true, is by no means a novelty in metallurgy, as Mr. John Dawes generated it at the Oldbury Furnace, near Birmingham, by passing high-pressure steam through cast-iron retorts filled with coke and heated to bright redness. The patent office records of France, England and of this country prove that numerous similar attempts were under consideration as early as 1845 and the following years, but they all differ in many essential points from the Strong process, which has every element of success and seems destined to inaugurate quite a revolution, not alone in metallurgical, but also in domestic heating. The following analyses by Dr. G. E. Moore, giving the composition by volume of gas made at Mount Vernon, N. Y., will best elucidate the claims of the material. For comparison we add an analysis of coke gas by Knapp:

	Water gas.	Coke gas.
Oxygen.....	0.77	1.3
Carbonic acid.....	2.05	44.8
Nitrogen.....	4.43	31.5
Carbonic oxide.....	35.58	0.7
Hydrogen.....	39.76	4.11
Marsh gas.....	4.11	

It will be seen that approximately the nitrogen is replaced by hydrogen, and that carbonic oxide is about equal in both cases. Dr. Moore has calculated the calorific equivalent of Strong gas at 8795 units and its flame temperature at 5100° F., or above the point of dissociation of steam. These calculations, it is true, have but little value, as they are merely theoretical deductions from analyses; thorough practical calorific trials must be made in order to obtain data which will satisfy the iron master or manufacturer.

RECENT EXPERIMENTS WITH THE DU PUY PROCESS.

Since the experiments made at Reading with the Du Puy direct process, of which we gave a description in the issue of *The Iron Age* of Oct. 3, and by which it was shown that anthracite slack is sufficiently good material for deoxidation, some further trials have been made at the Sligo Iron Works at Pittsburgh, for the purpose of testing this process further, by throwing the lumps of metal into a Burdon squeezer, and then rolling them to "muck bar" at the same heat. Hitherto they had usually been forged to blooms under a hammer and afterward reheated, to be drawn to bars. The furnace was operated experimentally with 32 heats. There was found no difficulty in making balls to pass through the squeezer and muck rolls at the same heat, just as ordinary puddle balls from pig iron are squeezed and rolled at the same heat to muck bar, but in order to fill the squeezer, which required balls of 150 or 200 pounds to secure a good compression, it became necessary to weld and press several of the lumps of metal together in the furnace at a heat so high as to cause the alkali to drip more or less from the mass and soften the sand bottom. As the balls were thus compressed and rolled in the fused sand, an unnecessarily large portion of the iron was thereby cut by the sand and wasted to a silicate of iron, so that the yield from Republic ore, which before the bottom became softened produced 53 pounds of iron in muck bar from 100 pounds of ore charged, and which it was expected would have been brought up to 60 pounds of iron from 100 pounds of ore, gradually became very much lessened, showing conclusively that reduced yield followed the softening of the bottom and determined the necessity of a cinder bottom in order to save the iron. To compress and weld several of these masses of metal together in the furnace, in order to have them enter and fill the squeezer, really comprised all the labor required during the heat. The cases were 15 inches diameter and 14 inches high, holding about 135 pounds of ore besides the coke and fluxes. By making the cases very little larger, say 16 inches diameter and 16 inches high they would each produce about 100 pounds of iron, and by withdrawing each separately to the squeezer, all furnace manipulation of the metal would be avoided. Then, aside from maintaining the fire and charging and discharging the metal, all the labor really needed during the heat would be to change the damper once or twice, enabling an ordinary heater to regulate all the furnaces in the largest mill. Expensive fluxes, such as soda, manganese, &c., have been abandoned, as it has been now conclusively proved that a proper mixture of aluminous and silicious ores with lime, to produce a non-flowing glassy slag, is all that is required. This glassy slag being mingled among the particles of ore, covers and seals them from reoxidation from furnace heat during the process of reduction. When either of these glass-making constituents are not available in the proper proportion in the ore, ordinary sand or clay, in the proper proportions, may be added to the lime and mixed together without injury to the metal, as the glass is readily compressed out of the iron by the hammer or squeezer. It was found also during these experiments, which we take from the *Journal of the Franklin Institute*, that No. 25 sheet iron rolled out at the mill from common puddle bar will answer as well for the cases into which ore, carbonaceous matter and fluxes are filled, as will finished sheets from the best iron.

quota demanded. The result is of course very uncertain, and the trade is in a greatly demoralized condition in consequence. Prices are confessedly "nowhere," and no regular quotations are given; in fact, no attempt whatever is made to make uniform prices, each one making such prices as it seems possible to obtain. Buyers are very scarce, and there is a good deal of coal being "peddled" to find a purchaser. We hear of some cargoes offered at very low figures, and in one or two cases purchases were made. In general, however, consumers are shy, and prefer to wait and see whether a new combination is to be formed. If a general war ensues, prices, of course, will be slaughtered, and coal purchased at present figures, although very low, will hardly be considered a good bargain. Retail dealers here in the city are running with as light stocks as they can safely carry and fill their orders from day to day. Even the retail trade has stopped, and the carts have very little work or are entirely idle. In the face of all this the month's quota is increased by a million tons. Coal is consequently coming down freely, and stocks have already begun to accumulate at the shipping points. The present uncertain condition of trade must continue until some understanding has been reached in regard to the combination. In some circles the remark has been made that no permanent change can come to the trade until they fight the battle out and send the weak ones to the wall, and bring about a pretty general bankruptcy. Be this as it may, it is very difficult to see how the great carrying and mining companies can escape from a very serious fight for existence.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., Philadelphia, Dec. 10, 1878.

Pig Iron.—There has been a fair amount of business transacted considering the season, and the market holds steady and firm. At this late season a falling off in the demand is usually looked for, but up to date business continues active, with continued evidences of a desire to purchase somewhat in excess of the offerings. This refers to standard brands only; inferior and doubtful lots are not sought for, and can only find purchasers at low and uncertain figures. Brands of established character appear to have reached a point at which there is no difficulty in making sales, and unless the supply is increased or the demand slackens some little advance in prices is not at all unlikely. The near approach of the holidays, however, will doubtless check the demand, and if stocks begin to accumulate buyers will be in a position to supply their wants at prices now ruling. This, in fact, is the opinion of the most experienced men in the trade, viz., that the tone of the market at present is very firm, but that the dullness usual at this season may result in some accumulation of stock at the furnaces, and thus for the time being prevent any change in prices. There is more confidence in values, however, than we have seen at any time within the past three years, and the feeling among all classes is that at present figures for good iron there is no danger in carrying stock. There is a degree of caution, however, which prevents extensive speculative purchases. Buyers are not so eager to anticipate their wants to any great extent unless they obtain concessions for so doing, while sellers are equally indifferent unless they can obtain current rates. Business is therefore largely confined to immediate deliveries, the future being left in a measure to the developments of the new year. It is satisfactory to note, however, that there are no fears of any break in the market, and this feeling of confidence will do much to remove the depression which has so long pervaded the entire business of the country. We quote as before, with the larger portion of the business at medium rates. Prompt cash occasionally enables buyers to place their orders at inside quotations, but such transactions are exceptional. We quote: Select No. 1 Foundry, \$17.75 @ \$18.50; ordinary Lehigh brands, \$17 @ \$17.50; No. 2, \$16; Gray Forge, \$15 @ \$16; White and Mottled, \$14.50.

Blooms.—Continue dull, and it is difficult to sell large lots. Prices are nominally unchanged, viz.: Blooms (240 lb), \$38 @ \$39; Northern Ore Blooms (240 lb), \$33 @ \$37; best quality Charcoal Billets (240 lb), for wire and steel purposes, \$58 @ \$60; Bars do., \$62.50 @ \$65; Sheet Iron Blooms, cornered (240 lb), \$53 @ \$55; Cold-blast Charcoal Plate Blooms, \$50 @ \$53; run-out Anthracite, \$45 @ \$47.50.

Muck Bar.—There are buyers at \$28 @ \$29, but holders ask \$30 and upward, so that there is very little business doing. Small lots of extra quality command about \$32.

Structural Iron.—A fair business has been transacted during the week past. No large amounts have been called for, but the demand for small lots has been quite active, and for the season a satisfactory business is reported. Prices are a little weak, however, and although we make no change in quotations, desirable orders continue to be accepted at concessions of one to two-tenths from asking rates, which are about as follows: Angles, 2.2¢ @ 2.4¢; Tees, 2.4¢ @ 2.5¢; Beams and Channels, 2.7¢ @ 2.8¢.

Plate and Tank Iron.—There is not much change in the general condition of the market, and with one or two exceptions the mills are rather bare of orders and report but few inquiries, with some weakness in prices. At this season no immediate improvement can be expected, but with the cheerful outlook in other directions it is not likely that the depression in this department will be very protracted. In the meantime we quote the market dull and prices weak, as follows: Common Plates, 2.2¢ @ 2.3¢; Tank Iron, 2.3¢ @ 2.5¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.5¢ @ 2.9¢; Flange Iron, 3.7¢ @ 4¢; Solid Firebox, 4.8¢ @ 5¢, and Best Bloom, 5.5¢ @ 6¢.

Sheet Iron.—The demand has dropped off somewhat suddenly, and but few orders have been entered since date of our last report. Business is now rather of a retail character, small lots to make up an assortment and parcels for immediate use. The season is evidently drawing to a close, and although a large amount of stock has been

marketed the result of the year's business is not likely to turn out satisfactorily. Prices have been steadily declining, and it is doubtful if manufacturers will come out whole. No change in prices is expected until after the first of the year, when there may be some readjustment, according as balance sheets may indicate. We quote: Common Sheet, No. 20 to 23, 2.8¢ @ 2.9¢; No. 24 to 26, 2.9¢ @ 3¢; No. 27 to 28, 3.1¢ @ 3.15¢; Best Refined Sheet, No. 25 to 28, 3.2¢ @ 3.3¢; No. 22 to 24, 3.1¢ @ 3.2¢; No. 16 to 21, 3¢ @ 3.1¢; Best Bloom Sheets, No. 25 to 28, 5.1¢ @ 5.2¢; No. 22 to 24, 5¢ @ 5.1¢; No. 16 to 21, 4.7¢ @ 4.8¢; Refined Plates or Blue Annealed, 5-16 to 16, 2.3¢ @ 2.4¢; American, R. G., 5-16 to 16, 2.9¢ @ 3¢; Best Bloom, 5-16 to 16, 4.8¢ @ 4.9¢; A Patent Planished, 10½¢ @ 11¢; B Patent Planished, 9½¢ @ 10¢; Best Bloom Galvanized, 45% discount; second quality, 55%; extra discounts for large lots.

Bar Iron.—There is no change to note in the Bar trade, and prices are still somewhat unsettled and irregular. Several leading mills are full of work, for which it is claimed full prices have been obtained, but others find it difficult to secure orders unless at concessions from quoted rates. It is difficult to reconcile the statements made by leading manufacturers on any ground except that each will make its own classification, and that those getting the most business make the greatest allowance on extras. The base price for Best Refined Iron is supposed to be 1.9¢, and all claim to be firm at that figure, although buyers report that they can place orders for extras at prices equal to 1.6¢ @ 1.7¢ as base on the old list. This feature of the market is very discouraging. There is a moderate amount of business doing, a fair inquiry for additional lots and a satisfactory outlook generally, but with no fixed basis of values. There is a degree of uncertainty which is rather disquieting. We regret that such a report has to be made, but the facts are too important and too well known to be ignored. When the trade is on a better footing we shall so report it. Meantime prices are nominally as before, viz.: Common Iron, 1.5¢ @ 1.6¢; Medium, 1.7¢ @ 1.85¢; Best Refined, 1.9¢ @ 2¢.

Steel Rails.—There is not much new business to report as definitely closed, but a large amount is well under way and likely to be closed in course of a few days. Buyers are doing their utmost to get prices down; many leading companies having bought last year at about \$40 are unwilling to give in their orders at about \$2 advance, which is usually demanded. Small lots have been placed at \$44 at tide, and a large amount of business could be closed immediately at prices equivalent to a reduction of \$1 to \$2. Sellers are firm, however, and at the moment, there is not much probability of lower prices, although as stated, the leading buyers are reluctant to pay any advance on prices current at this time last year. The market is firm at \$41 to \$43 at mills, according to location, the lower figure being for large lots and deliveries favorable to the seller.

Steel Blooms.—Slabs are quoted at \$42 @ \$46, and Billets at \$48 @ \$50.

Iron Rails.—The demand is well maintained and several fair-sized orders have been placed during the past week; one lot of 800 tons 25 pound section is reported, and numerous small lots, chiefly of light rails; also a 2000 ton lot rolled for export. Prices are steady, and with a considerable amount of work on hand at the mills the market may be considered firm at former quotations, viz., \$32.50 @ \$35, according to quality, section and location of mill.

Old Rails.—The market is still bare of stock, and anything of a reasonably fair quality has sold readily at \$19.50 @ \$20. We do not hear of any lots offering for spot delivery, but there are buyers at the above figures, and higher for extra qualities. A lot of 2500 tons was sold a day or two ago at \$19.50 at a point near the city, and for spot lots \$20 is obtained in a small way. We quote the market steady at \$19.50 @ \$20 for average qualities.

Spikes.—The demand continues good and prices steady as follows: 5½ x 9-16, 2¢; ¼ x 4 and longer, 2.3¢; 7-16 x 4 and longer, 2.4¢; ¾ x 3½ and longer, 2.7¢; ¾ x 3 and longer, 2.8¢.

Scrap Iron.—The market is fairly active, and selected qualities command outside figures, viz.: Cast, \$14 @ \$15; Wrought, \$20 @ \$22.50.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Dec. 10, 1878.

The inclement weather has had a tendency to curtail general business, which at best is always light this month; nearly all our manufacturers report that orders have fallen off considerably within the past week or two, and while some of them still have about all they can do, having been sold ahead of their production, others have found it necessary to curtail their production for want of orders, being anxious to close the year with as little stock on hand as possible. However, while there is a lull at present, it was not unexpected, and the outlook is regarded favorable for a good spring trade, which usually opens up about the middle of January. Stocks of manufactured goods, both in first and second hands, are comparatively light, and the production is likely to be light for some time to come, as a large percentage of capacity, it is probable, will continue unemployed, having passed into the hands of creditors, who, owing to the very small margin for profit, will be in no hurry about starting up again; and, moreover, as times get better there will be an increased consumption.

The most serious drawback to our manufacturers apparent at present is that of increased taxation, which is highly probable in view of the recent decision of the Supreme Court, that the city must make provision for meeting both the interest and principal of her street bonds. While the decision is generally regarded as a righteous one, as the bonds never could have been negotiated had not the city guaranteed their payment, it is a hard blow on the taxpayers, and it is feared, by increasing the already burdensome taxes, will have a bad influence on the general welfare of the city. Real estate, owing to the heavy taxation, is almost worthless; holders generally want to

sell at a sacrifice, and even then it is hard to find buyers, as there is very little inducement to put money into property, even if it can be bought for one-half what it would have brought a few years ago. Many of our manufacturers who are large owners of property would, we have no doubt, be satisfied if they could make clear what they have paid out for taxes. However, there is some consolation in knowing that Pittsburgh is not singly and alone in this respect; nearly all the large cities are in just as bad, if not a worse, condition, and there is no question but this is a serious hindrance to a return of prosperity.

The most important event of the week was the meeting of the Western Nail Association, the first for a long time, and a much better feeling prevails in consequence. Arrangements are being made for a meeting of the Western Iron Association in a few days, which it is hoped will be productive of good.

Pig Iron.—There has been no particular change in the situation since our last report; business continues quiet, as it always is this month, while prices remain unchanged. One of our commission merchants, however, reports having had offers on several round lots, but the figures offered were unsatisfactory to the furnaces. This indicates a healthy market, showing that producers, notwithstanding the present lull, are refusing to make concessions in order to effect sales; also, that some buyers at a slight reduction from current rates would not object to anticipating future wants. It is well known, and very generally conceded by those who are familiar with the business, that even those furnaces favorably located, having all the latest and most important improvements and under the best of management, cannot more than hold their own at prices now current, and moreover, the cost of production has been reduced down to the lowest notch and is more likely to be increased than reduced. Indeed coke, which is a very important factor in the production of Pig Iron, has gone up 10¢ @ 15¢ per ton within the past few weeks; the cost of mining coal has been recently advanced half a cent per bushel, and it is pretty evident that labor is down to the bottom; this being the case, we can see no reason why the value of Pig should depreciate, nor, on the other hand, is there any reasonable probability of an early advance of any consequence. Bituminous Coal Smeled Irons still quoted at \$19 @ \$20, 4 mos., for Foundry, and \$17.50 @ \$19.50, 4 mos., for mill, the outside figure for all-ore Red Short; Coke Irons, \$16, cash, to \$16.50 for mill. Charcoal Iron very dull, scarcely enough doing to establish prices. Bessemer Pig continues quiet and unchanged at \$20, 4 mos., for No. 1. There is said to have sprung up quite a demand for No. 3 Bessemer recently for special purposes, and it is selling more readily than No. 1. Charcoal Blooms quoted at \$55 @ \$60.

Manufactured Iron.—Orders continue to fall off, as they usually do this month, and some of the mills within the past week have changed from double to single turn; however, business is fair for the season, and the outlook for the spring trade continues promising. The indications are that the consumption of finished Irons will be considerably larger in 1879, as compared with 1878, and it strikes us that the first change in prices will be upward, as, like the raw article, there is a very small, if any, profit at the prices now ruling. Another important matter lies in the fact that the production is comparatively light, a number of mills in the West still being in lock, with but little prospect of being started up soon. Prices are still quoted upon a basis of \$1.75, 60 days, for Merchant Bars.

Nails.—The meeting of the Western Association, which took place here last week, was largely attended, all the 26 mills belonging to it being represented, with one or two exceptions; notably among the absentees were the Belfont mill at Ironton and the Norton Works at Ashland, Ky. The session, while a most important one, was characterized by great harmony, and was protracted until 10 o'clock Wednesday night. The price agreed upon, \$2.15, 60 days, 2¢ off for cash, and a reduction of 10 cents per keg on lots of 200 keg lots and upward, was satisfactory, and while it is an advance, the margin for profit is still small. It was also agreed to fix the price at Chicago and St. Louis, the two great points of distribution in the West, at \$2.25, 2¢ off for cash. The project of "pooling" was discussed at considerable length, but no definite action was taken. It is proposed to establish agencies at Cincinnati, Chicago, St. Louis and Cleveland, through which all Nails are to be sold on a cash basis, and all traveling salesmen are to be cut off. However, each mill is to remain under control of its present management, and in this important respect it will differ from other pools. The project, which appears to meet with considerable favor, will be passed upon at the next regular meeting of the Association, which takes place on the 18th instant in this city.

Rails.—The market for Steel Rails is still quoted steady at \$44, cash, delivered free on cars in Pittsburgh. New Iron Rails are also firm, with a tendency to higher prices. Old Iron Rails continue in light supply, and with considerable inquiry are firm, although we have heard of no sales having been made above \$23, and buyers do not appear willing to go above that figure, although it is said they cannot be laid down here from any of the sources of supply under \$23.50 @ \$24.

Steel.—The demand is not active, nor is it to be expected at the close of the year; prices easy, but without quotable change. Machinery Steel, 4½¢ @ 7¢; Tool do., 10½¢ @ 12½¢; Tire Steel, 3½¢ @ 6¢; Boiler Plate, 6½¢ @ 7½¢; Plow Steel, 3½¢ @ 7¢; Spring Steel, 3½¢ @ 6½¢; Steel Blooms, \$41.50 @ \$42; do. Billets, \$43.50 @ \$45; do. Bloom Ends, \$30 @ \$32; do. Rail Ends, \$30.

Wrought Iron Pipe.—The demand for all kinds of Wrought Iron Pipe is light, as it usually is this month, and there is not likely to be any improvement until the spring trade opens up. Discounts on butt-weld still quoted at 6¢ @ 6½, with rumors of 7¢ being in some cases allowed. Boiler Tubes, 40¢; Oil-well Casing and Tubing, not cash.

Scrap.—The movement in all kinds of Scrap is light, although fair for the season; no recent change in prices. No. 1 Railroad Wrought Scrap, net, \$21; Boiler Scrap, \$22; Old Car Wheels, gross, \$18 @ \$19; Wrought Turnings, net, \$14 @ \$15; Cast Borings, gross, \$10 @ \$11; Car Springs, net, \$31; Car Axles, \$27 @ \$28; Blacksmith Scrap, \$20.

Coke.—There is no apparent falling off in the demand; manufacturers are all well supplied with orders, some of them are sold considerably ahead, and prices continue firm, with an upward tendency. We continue to quote at \$1.05 @ \$1.15 per ton, free on cars at ovens. Shipments continue to be made in all directions, both by river and rail, and we do not think there is any risk on the part of buyers in making contracts at current rates, as we are well satisfied that prices are more likely to advance than decline. A number of Eastern furnace companies are now using Coke in connection with Anthracite Coal, and with, we understand, the most satisfactory results.

Coal.—The Coal trade continues quite active, and with a continued good stage of water liberal shipments are being made West and South by river. There is also considerable inquiry from points in the interior, and the railroads have a demand for about all the cars they can furnish. Prices continue firm, but unchanged.

Window Glass.—The demand has fallen off considerably within the past week or two, as it usually does at this particular time, and business is likely to drag until the spring trade opens up, which cannot be looked for until about the 1st of February. Trade has been unusually active this fall, but prices were unremunerative. Discounts may be quoted at 75 @ 75 and 5.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, Dec. 7, 1878.

There is a steady and healthy growth in general business in this district. Newspapers are generally regarded as excellent business barometers, and our papers generally are better patronized by advertisers this season than I have observed them to be at any time during the last five years. Merchants are hopeful and are pushing business. In the general Iron trade there is a better feeling than has been experienced since 1872. Not that prices have materially advanced, but because present rates are very stiffly maintained, and of the general conviction that bottom has been touched, and that resumption and other forces will gradually build up trade on solid and reliable foundations. The general Eastern and Northern tone has helped to inspire confidence here. The hopeless bankruptcy of antiquated furnaces and mills, and the ruin of their legions of successive adventurous operators has about reduced the Iron-making business in this region to legitimate capital in skilled hands, which operate fewer plants, but will finally produce a larger volume and better articles.

Pig Iron.—The recent advance in Forge Irons has been maintained. Sales are only fair. Holders are crowding the market. Orders are only to fill present demands of consumers, a state of trade likely to continue until after the holidays. We quote: Coke Irons, No. 1 Foundry, \$17.50 @ \$18; No. 2, \$15.50 @ \$16; Gray Forge, \$13.50 @ \$14; White and Mottled, \$11.50 @ \$12. Hot-Blast Charcoal—No. 1 Foundry, extra, \$20 @ \$21; ditto, \$18 @ \$20; No. 2 Foundry, \$16 @ \$18; Gray Forge, \$15 @ \$17; White and Mottled, \$15. Cold Blast Charcoal—Car Wheel Metal \$22.50 @ \$27.50; do., Extra Standard, \$24 @ \$20.50; Forge, \$17 @ \$22.

Muck Bar.—\$27 @ \$34. Old Rails, \$18 @ \$18.50. Old Car-wheels, \$18.

Ores.—Brown Hematite, 50 to 56%; per ton, \$1.75 @ \$2.25. Red Fossiliferous, 50 to 56%; per ton, \$1.70 @ \$1.90. The above prices for ores delivered in Chattanooga on cars or on the wharf from flat boats.

Nails.—There is nothing new to note here. Makers hope the action of the Western Association advancing Nails at Pittsburgh, and upper Ohio mills generally, from \$1.95 @ \$2 to \$2.15 rates at the mills will have a good effect here, and enable our mills to realize a reasonable profit. We also learn that the Association fixed the price at Chicago and St. Louis at \$2.25. If this action "sticks" it will serve to restore the Nail business to something like a fair and healthy condition.

Manufactured Iron.—Business continues to be good, with signs of an advance in rates on some articles. The mills are running to their full capacity, and have orders enough in hand to insure them a fair winter's work, if there should be a considerable slackening in the demand—an event not likely to happen. Railroad supplies are rather better than usual at this season of the year, in part due to the fact that repairs were almost all wholly suspended on our roads during September and October. Bar we quote at \$1; Railroad Spikes, \$2.50; Light Rail, \$2.25; Track Bolts, \$3; Trestle Bolts, \$4.

Coke.—We have now in market a supply of washed foundry coke of excellent quality, which we quote at 13¢ to 15¢ per bushel, free on cars in Chattanooga. Furnace Coke we quote at \$2.50 per ton and in good supply. One manufacturer has offered to make contracts in large amounts at \$2 per ton.

Coal.—This important article is in good supply and prices rather tend downward, on account of the sharp competition of producers and dealers. Most desirable qualities for domestic use are delivered at 12½¢ @ 14¢ per bushel. Run of mine to manufacturers \$1.50 @ \$1.75 per ton.

Pig Lead.—From local mines 4¢.

Ingot Copper.—The slight advance realized is maintained. We quote at 18¢.

Iron Rails.—The demand is fair, mostly for re-rolling. Holders are firm at \$34 per ton.

BOSTON.

Dec. 9.—Pig is dull and depressed. At the shipping ports, Foundry No. 1 is quoted at \$16.30 @ \$17; Foundry No. 2, \$15.50 @ \$16.50; Gray Forge, \$14.50 @ \$15.50. There is nothing new in the market for

Scotch Pig. Eglinton is still held at \$22.50, Glengarnock at \$24, Gartsherrie at \$25 and Coltness at \$26. Nails have been in fair demand, jobbing now at \$2.25 @ \$2.30. For 100-keg lots \$2.20 is the price. Sheet is selling at 3¢ @ 3¼¢ per lb. Russia is quiet at 10½¢ @ 11¢. We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13¢ @ 13¼¢ for Cast; 9¢ for Blister, and 7¼¢ @ 8¢ for Machinery. In Plate Iron there continues to be a fair degree of activity in Tank, which is selling steadily at 2¼¢. Boiler Plate is very dull, quoting 2½¢ for No. 1 Charcoal, 2½¢ @ 2½¢ for No. 1 Shell, and 3¼¢ for Flange. Merchant Bar jobs at \$1.65 @ \$1.75. Copper is dull and steady, and we have no change to note in quotations. For manufacturers we quote: New Sheathing at 2½¢ @ 26¢. The outside price rules in small transactions, but large buyers are purchasing at the inside figure. Bolts are quoted at 26¢ @ 28¢. Yellow Metal Sheathing continues easy, quoting 12½¢ @ 13¢ for English, and 13¢ @ 13½¢ for American; Yellow Metal Bolts, 18¢ @ 20¢. Lead is firm at the advance, and seems to be under strong speculative control. We quote: Pig, 4½¢, currency; Sheet, 5½¢; Pipe, 4¼¢; Tin-Lined Pipe, 12¢; Bar Lead, 4¼¢; all of these excepting Pig are subject to the usual trade or 10% discount. Antimony is firm and fairly active, and we quote 12¢ @ 12½¢. Spelter continues firm, with little disposition on the part of buyers to sell on the spot at less than 4¼¢ @ 5¢ for 10-ton lots. Tin has ruled very quiet and prices are unchanged. We quote: Straits, 16½¢ @ 16¾¢; Banca, 19¢; Refined English, 16¢ @ 16¼¢, gold. We quote Plate: Charcoal, I. C., \$5.75 @ \$6; Coke, \$5 @ \$5.25; and Charcoal Turned, \$5.40 @ \$5.50, gold.—Commercial Bulletin.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Dec. 9, write us as follows: The market continues very firm in price. Sales are somewhat curtailed, and will be until after January 1st, but after that date we look for a brisk demand. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	\$21.00 @ \$22.00
No. 2 Hanging Rock, Charcoal	19.00 @ 20.00
No. 1 Southern, Charcoal	18.00 @ 19.00
No. 2 Southern, Charcoal	16.50 @ 17.00
No. 1 Hanging Rock, Stonecoal and Coke	19.00 @ 20.00
No. 2 Hanging Rock, Stonecoal and Coke	18.00 @ 19.00
No. 1 Southern, Stonecoal and Coke	18.50 @ 19.00
No. 2 Southern, Stonecoal and Coke	17.00 @ 17.50
"American Scotch"	18.00 @ 19.00
Silver Gray	16.00 @ 17.00

MILL MOSS.

No. 1 Charcoal, Cold-short and Neut'l	16.50 @ 17.00
No. 2 Stonecoal and Coke, Cold-short and Neut'l	16.50 @ 17.00
No. 3 Stonecoal and Coke, Cold-short and Neut'l	15.50 @ 16.00
No. 1 Missouri and Indiana, Red-short	20.00 @ 21.00
White and Mottled, Cold-short and Neut'l	14.50 @ 15.00

CAR WHEELS AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	29.00 @ 33.00
Alabama and Georgia, Cold-blast	28.00 @ 29.00
Kentucky, Cold-blast	25.00 @ 30.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 West Main street, under date of Dec. 9, write that both the volume of trade and general prices are characterized by remarkable steadiness for the season. Although so late, the demand is still very active for Sheet Iron, and Bar and Hoop are in request at full and even advancing prices. The advance in Nails is accepted by everybody as the right thing, and purchasers are less afraid to take hold of them than they were. The financial situation at the South grows daily more encouraging, and merchants and manufacturers here find no evidence in their own recent experience to bear out the alarming newspaper estimates of losses by the yellow fever. The well-circulated item that places the aggregate loss by the epidemic at \$200,000,000, is based upon fanciful and unverifiable guesses at the value to the community of human beings considered as productive capital. So far as we can judge the South is in a sounder and more solvent condition to-day than ever before, and the prospect of a busy and prosperous new year was never better.

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, under date of Dec. 5: Pig Iron business remains about the same—no special change in prices. Cheap priced Irons are becoming scarce. Prospects for better prices good. Old Rails are very scarce and firm at quotations:

COLD-BLAST CHARCOAL—All Numbers.

Hanging Rock	4 mos.	\$23.00 @ \$25.00
Tennessee	4 mos.	22.00 @ 23.00
Kentucky	4 mos.	22.00 @ 23.00
Missouri	4 mos.	22.00 @ 23.00
Georgia	4 mos.	22.00 @ 23.00
Alabama	4 mos.	22.00 @ 23.00
Assorted Bar Iron	4 mos.	1.95 rates.
No. 1 Wrought Scrap	"	50 " "
Heavy Cast Scrap	"	50 " "
Light " "	"	40 " "
Old Rails, ½ ton	4 mos.	20.00 @ 21.00
Old Car Wheels, ½ ton	4 mos.	17.00 @ 18.00

	No. 1.	No. 2.	Mill.	White and M't'd.
Missouri Stone Coal	\$21.00	\$20.00	\$19.00	\$17.00
Missouri Charcoal	20.00	19.00	18.00	17.00
Tenn. Charcoal	20.00	18.50	17.50	16.00
Tenn. Coke, very soft and strong	20.00	19.00	17.00	16.00
Hang. Rock Charcoal	23.00	20.00	19.00	18.00
Hanging Rock Cold-short	"	"	"	"
Extra " "	"	"	"	"
Alice Hanging Rock	No. 1.	No. 1.	No. 1.	No. 2.
Coke	22.00	21.00	19.50	19.00
Moxahala Blackband	21.00	20.00	19.50	18.00
Ores	21.00	20.00	19.50	18.00

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of Dec. 9, write us as follows: We have to report a fair demand, mostly for immediate consumption. Buyers as usual at this season are curtailing purchases that their stock may be as light as possible when they invoice. Prices range about the same:

HOT-BLAST FOUNDRY.

Hanging Rock C. C. No. 1	\$21.00 @ \$22.00
C. C. No. 2	19.00 @ 19.50

Alice, No. 1 Extra, I. M.	20.00 @ 20.50
" No. 1, N. O.	19.00 @ 19.50
Hanging Rock Coke and S. C. No. 1.	15.00 @ 15.50
Virginia Coke, No. 1.	19.00 @ 19.50
" No. 2.	17.50 @ 18.00
Shawnee S. C. No. 1.	16.00 @ 16.50
" S. C. No. 2.	15.00 @ 15.50
Hocking Valley S. C. No. 1.	16.00 @ 16.50
" S. C. No. 2.	15.00 @ 15.50
FORGE IRONS.	
Hanging Rock, No. 1 C. C.	18.50 @ 19.00
Hanging Rock, No. 2 C. C.	17.00 @ 17.50
Longdale, No. 1 C. C.	17.00 @ 17.50
Ala. and Tenn. No. 1 C. C.	17.00 @ 17.50
Red-short, No. 1 C. C.	18.00 @ 18.50
Cold-short, No. 1.	15.50 @ 16.00
Old Ralls, prime.	15.00 @ 15.50
CAR WHEEL AND MALLEABLE.	
Hanging Rock C. B.	30.00 @ 31.00
Cherokee C. B.	28.00 @ 29.00
Southern and Western Brands.	27.00 @ 28.00

RICHMOND.

Mr. ASA SKYDER, Iron Merchant and Furnace Agent, writes as follows under date of Dec. 9: Sales are effected, of nearly all classes enumerated in the following schedule, to an unusual extent for the season of the year. The market is decidedly firm.

American Scotch Pig Iron.	\$21.50 @ 22.50
Anthracite, No. 1.	19.00 @ 19.50
" No. 2.	17.00 @ 17.50
" Mottled.	14.50 @ 15.00
Coke, No. 1.	19.00 @ 19.50
" No. 2.	18.00 @ 18.50
" No. 3.	17.00 @ 17.50
Va. Cold-blast Charcoal, Cold-short.	20.00 @ 20.50
" Neutral.	27.00 @ 28.00
Va. Warm-blast.	18.00 @ 18.50
" Red-short.	17.00 @ 17.50
Old Ralls.	17.00 @ 17.50
Wrought Scrap No. 1.	15.00 @ 15.50
Cast (machinery).	15.00 @ 15.50
Richmond Refined Bar Iron.	30. @ 31. @
Horse Shoes per keg.	5.00 @ 5.50
Mule.	5.00 @ 5.50
Old Dominion Nails, Standard Size, 1/2 keg.	2.25 @ 2.50
Freights to Philadelphia, \$1.40 per ton of 2240 lbs., by rail.	
Freights to New York, \$1.50 per ton of 2240 lbs., by rail.	

BALTIMORE.

Mr. W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following prices under date of Dec. 9: This market does not present any changes to note for the past week, business being confined to the moderate order trade usual at this season. Values rule firm and unchanged.

Refined Bar Iron, 1 to 6 wide by 1/2 to 1 thick.	\$1.85 @ 2.00
Refined Bar Iron, 1 to 4 1/2 wide by 1/2 to 1 thick.	1.85 @ 2.00
Refined Bar Iron, 1/2 to 2, Round and Square.	2.15 @ 2.25
Hoop Iron, 1 1/2 wide and upward.	2.15 @ 2.25
Band Iron, from 1 1/2 to 4 in. wide.	2.15 @ 2.25
Horse-shoe Iron.	3. @ 3.25
Norway Nail Rods.	3. @ 3.25
Black Diamond Cast. Plates, Squares and Octagons, ordinary sizes.	13. @ 14. @
Machinery Steel.	8. @ 10. @
Cast Spring Steel.	6. @ 6.50
Homogeneous Steel Pig.	7. @ 7.50
Common Horse Nails.	13. @ 16. @
R. R. Spikes, 5/16 to 1 1/2.	2.15 @ 2.50
Perkins Horse shoes, 1/2 keg of 100 lbs.	\$3.60 @ 4.00
Mule shoes.	4.00 @ 4.50
Putnam Horse Nails.	18. @ 20. @
Globe Horse Nails.	18. @ 20. @
Less list discount to the trade.	

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of Dec. 9: Below we quote you present prices for Pig Iron and Blooms, viz:

Baltimore Charcoal Pig.	\$26.00 @ 28.00
Virginia.	26.00 @ 28.00
Anthracite No. 1.	19.00 @ 20.00
" No. 2.	18.00 @ 19.00
" Mottled and White.	13.00 @ 14.00
Charcoal, C. B. Blooms.	50.00 @ 52.00
Billets.	50.00 @ 52.00
Refined Blooms.	43.00 @ 45.00

FOREIGN.

FRANCE.

(Montreux des Interests Matérielles.)

PARIS, Nov. 24, 1878.—Metals.—Business has been slowly improving, especially in the export line, due, in a measure, to new connections formed at the late Exhibition. Copper is less strong in England, in view of the lessened demand from London for manufactures of Copper for India. Here we are steady after quite an advance in Chili Bars of 2.50 francs. We quote, deliverable at Havre, Chili Bars, 160 francs; Common ditto, 155; Ingots and slabs, 152.50; Best Selected English, 165; and Peru Corocoro Ore, 160 francs the 100 kilos. Havre is steady; they quote first brands Chili Bars, 152.50; 155; good current ditto, 150 to 151.25; and Lotia and Urmeneta, 147.50 to 150. Paris is quiet. At Marseilles Copper is held, but without demand; they quote Spanish, in slabs, 150; Red Tokat, 155; small Refined Ingots, 165; Sheathing, 185; Bolita, 190; and Yellow Metal Sheathing, 180. Tin has been somewhat scarce here, and there is comparatively little doing. The tendency remains a favorable one, except so far as Billiton is concerned, which has declined 2.50 francs. We quote Banca, 172.50 francs the 100 kilos; Billiton, 167.50; Straits, Australian and English, 160. At Marseilles Tin remains firm and improving. They quote Banca, 165; Straits, 155 to 160; Billiton, 155 to 160; and English Refined, 170. Lead continues to be a disappointment to everybody. We are weak here after a decline of 2.50 francs. We quote French Lead, 45 francs the 100 kilos, and French from Spanish ore, Spanish and English, 37.50. At Havre first fusion soft Spanish is worth 41 at 42. At Marseilles Lead is quiet; they quote first fusion, soft, 37; second, 36.50; Sheet, 35.50; and There is and Shot, 42. Spelter.—There is little disposition to buy, notwithstanding low prices. Paris is very quiet and lower. They quote here, Silesian, deliverable at Havre, 45.50 francs the 100 kilos; other good brands at Havre, 45.50; at Paris, 46; Vieille Montagne Sheet, 62.50; Royal Asturian Co.'s, 60, and Blanche Saint-Vaast, 58. At Havre, Silesian is quoted 45.50 @ 46. The following are the Marseilles quotations: Vieille Montagne Sheet, as well as Southern, 45; Old Refined in slabs, 45. Iron.—The position of the iron market is about as bad as ever; there seems to be a glut of stock on the one hand, and a decrease in the demand on the other. Across our iron meets with a stout competition everywhere. It should be remembered, however, that the rolling mills of France are worse off than the foundries. Dealers at Paris complain that the demand from local manufacturers is light, but that they are executing a great many orders lately received from the provinces. In the Haute Marne they complain of a lack of orders, and the managers of works assure us that in that quarter the minimum of values has been reached, at least so far as common iron is concerned. The English foundries have made a great attempt at flooding the Champagne district with their goods, but have thus far only lost money in doing so. In the Ardennes the demand for Nails and Wire for export has decreased in a striking manner. Affinage Pig Iron has not varied in the Meurthe and Moselle, but it is certainly less strong on account of an abatement in the demand. At the North the rolling mills are complaining, but Moulage Pig Iron stands the industrial stagnation better. At the Center work is improving in volume at Châtillon-Commeny. In the department of the Alier two forges have been blown in. The Loire works complain that the railroads are buying material in Alsace. Coal.—The cold weather stimulates the domestic demand, but manufacturers still hesitate in replenishing.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Nov. 24, 1878.—Iron.—The rolling mills in Belgium have little work on hand, nor is the general aspect a cheerful one. Orders are the reverse of plentiful, and prices unsatisfactory. There is always some maker who, for financial reasons, we presume, is selling at any price, one concern having lost 150,000 francs that way during the past month or two. Under these circumstances the Belgian Lion Company has evidently acted wisely in blowing out the fires of its forges. At all events this example will not be overlooked by others, and we presume many will do the same thing. The Ancieur Works have sold the Algerian Railroads some rails recently. That the revival in the iron trade in Belgium should be so slow is certainly a deplorable circumstance, and all the more to be wondered at when we come to consider the generally favorable situation of our iron region, both from geographical and economical point of view. Wages in Belgium are low, and the necessities of life are as low in this country as they are in any other in Western Europe, the facilities of extraction and shipment are unsurpassed. Capital in general abounds at a moderate rate of interest; our manufacturers and merchants are enterprising and active, yet we find it difficult, at present at least, to confront successfully foreign competition. Coal.—There is not much doing, and the little changing hands during the week has been for household purposes.

GERMANY.

(Borsenhalde.)

HAMBURG, Nov. 23, 1878.—Metals.—We can only repeat that the improvement in some leading metals brought about by speculation outside of Germany, is not accepted here without reserve and hesitation, and as at the same time the season is very much advanced, and the consumption as a general thing, decreases toward the close of the year, the German markets are deficient in buoyancy. Copper has been quite firm, but the dealings have been restricted to supplying the wants of actual consumers on a moderate scale. Absolutely nothing of a speculative nature transpires. Tin.—Business in this metal has been of a dragging nature. Prices are unaltered. Lead.—Hardly anything is done in this metal. Prices are weak, although not notably lower. Spelter has been altogether nominal in value, and dealings are limited to trifling lots. We refer to our last week's quotations of this metal and the preceding ones.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Nov. 24, 1878.—Tin.—There is little fluctuation. The demand for consumption is limited, and there is little doing. Billiton have been effected at 38.50 guilders the 50 kilos, and of Banca at 39.50.

CHINA.

(Arnhold, Karberg & Co.)

CANTON, Oct. 23, 1878.—Coal.—The anticipations of a fortnight ago have been justified by the decidedly improved tone noticeable in this market since the issue of our last advice. The improvement is not very extensive as yet, but it is distinctly marked, and there would seem to be every reason to believe that the upward tendency will continue developing itself, and that the market generally will be placed on a healthier footing than has been the case for a long time past. The quotation for favorably situated Australian Coal has already rebounded to \$7.25, at which figure the cargo of the Carlton has found a buyer. A well-sustained demand still prevails, and distant arrivals would meet with a ready sale at from \$7.25 to \$7.50 per ton. Cardiff Coal, which has still been selling in small lots to suit purchasers at \$8.30 per ton ex godown, but stocks are getting reduced and cargoes afloat could be placed without difficulty at \$9 per ton.

EAST INDIES.

(Clark, Spence & Co.)

POINT DE GALLE, Oct. 30, 1878.—Plumbago.—Business has been almost entirely restricted to dust, of which only inferior qualities are offering. Fine Dust and Chips are scarce, and command high prices. We quote: Lumps, 80 rupees @ 130 rupees; Chips, 65 @ 85, and Dust, 45 @ 65. Coal.—A cargo of 550 tons Australian, 100 tons Ocean, Merthyr, Cardiff, ex Indian Empire, and a similar cargo per British Empire, have been placed on secret terms. Seeking cargoes Cardiff are likely to fetch 20 rupees per ton. Newcastle is in small request. Current rate for coaling steamers is maintained at 45/- free on board, into bunkers. Freight.—No improvement has yet taken place in Eastern freights, and with the large quantity of tonnage available everywhere, no immediate prospect of any advance seems probable. Exchange, 6 months sight 1/8.

(Schmidt, Kustermann & Co.)

PENANG, Oct. 18, 1878.—Tin.—There has been nothing done for either Europe or America. For China 5500 piculs were taken at \$7.27 1/2 @ \$7.15. Stock in bazaar, 1000 piculs. (Giffillan, Wood & Co.) SINGAPORE, Oct. 24, 1878.—Tin.—Last week the market was very dull, and dealers had difficulty in selling at \$7.50 picul, but this week there has been an active demand owing to the advance in London, at \$7.75 @ \$7.87 1/2 picul. The exports to New York since our last report have been 41 tons by direct steamer Merionethshire, 30 tons by direct steamer Glamorgan, and 30 tons by the steamer Priam via London. There are waiting to be shipped over 200 tons here and in Penang. Tonnage.—The supply of disengaged vessels is again increasing, and freights are very dull. For New York the Janet Ferguson and Queen of the Sea have cleared without any tin on board. The Olive H. Southard is actively loading, and will get away in a few weeks. There have been no charters from Boston. Exchange has from 3/8 1/2 recovered to 3/8.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., Nov. 25, 1878.

THE APFAN WAR

having at length become an actual fact, it is naturally uppermost in men's minds just now, albeit I should certainly be beyond bounds if I were to state that there is any excitement thereabout. There are persons who profess to regard the commencement of hostilities against the Ameer as but a preliminary to a war with Russia, but those who hold that extreme view are, I think, neither numerous nor influential. I don't suppose that a third of the nation would hold back from such an encounter if the necessity seemed to arise, but as matters now stand there hardly appears to be any likelihood of such a contingency arising. It is a very well known fact that Russia is at present vainly stumping Europe in order to raise another loan, hence it is inferred that the Czar's advisers will perforce keep out of the quarrel directly, even if they secretly, or even openly, encourage and subsidize the ruler of Cabul. So far the Indian authorities appear to have made

A GOOD BEGINNING,

and to have drawn the first blood, which, we trust, may in this case, as in other proverbial ones, prove half the battle. This contents us. So long as the military part of the business progresses satisfactorily the nation will have very little to say either for or against. There is no enthusiasm to be got up about the subjugation of a half-civil-

ized Central Asian potentate, yet when the bill comes in, as it surely will do, some of our reformers will doubtless get on the top octave and make things appear rather warm for the time being. With a view to killing anything like hostile agitation and political coalition, the Queen has been advised to call Parliament together on Dec. 5th for a winter session, a most unusual proceeding, and one never resorted to except in extreme cases. The

EFFECT ON TRADE

of this "little war" does not seem likely to be at all pronounced either in one or another direction. Indian business had previously been very severely hit by the Glasgow, Bombay, Moulmein, &c., suspensions, and our yearly transactions with Afghanistan have never been greatly in excess of a million sterling. Even supposing we lose all this for a time, there is as a set-off the increased government demand for all kinds of stores, for rifles, ordnance, ammunition, swords and bayonets, saddlery and other warlike equipments—all of which are pretty certain to be obtained from English houses. Thus, on the whole, there does not seem much reason for serious apprehension, especially when the further circumstances that India may possibly have to pay most of the expense is considered. We would have preferred no war, but there being (so the government tell us) no alternative, the nation seems disposed to let the matter run its own course. Meantime

THE COMMERCIAL SITUATION,

from a financial standpoint, is rather more promising, and much of the late pressure has been relieved. The Bank rate, for instance, has been lowered, so that bills are being discounted on cheaper terms. Further failures are, it is true, certain to occur, inasmuch as it is well known that about £3,000,000 worth of bad bills are in circulation somewhere or other in London, the holders of which are "gone coo." The mere foreknowledge of this, however, serves to divert it of its possible effects, and with increased caution city men pronounce themselves more hopeful than for some months past. In the manufacturing sense, nevertheless, the crisis continues with unrelenting severity, and we are constantly receiving the most cheerless accounts from all parts of the provinces and Scotland. Stocks are being augmented in spite of every possible effort to limit production; selling values are absolutely speculative and chaotic, and the demand is most limited both for the home and foreign markets. This being the case,

THE TARIFF QUESTION

is being publicly discussed with greater boldness and freedom than I personally ever remember during any previous period of bad trade. I may be wrong, but I should not be in the slightest degree surprised by a powerful party being started to advocate reciprocity pure and unmixed. There is, tentatively, already such an organization in existence, but it lacks cohesion and force at present. It counts many leading men among its supporters, nevertheless, and is pretty certain to be more prominently before the public before long. The programme of the agitators to this end is rather vague—the best definition of its terms being the following, recently enunciated by Mr. David MacIver, of the Cunard Steamship Company. He says they propose: "1. The abandonment, at the earliest possible moment, of all treaties of commerce except such as secure equal freedom of trade to both contracting parties. 2. The admission, duty free, as heretofore, from every quarter, of all raw materials which form the basis of our manufactures for export. 3. The imposition of a duty of 10 per cent. upon all articles of consumption received from foreign nations who impose a duty on our productions. 4. The admission of the same, duty free, from all our own colonies and dependencies, and from any foreign nations who may agree to accept our productions on the like terms. 5. The admission of the manufactures of foreign nations on terms of substantial reciprocity in every case; for example, the duty on French silks and woolsens to be equal to that imposed by France upon English cottons and woollens."

Mr. MacIver evidently believes in the immediate application of a severe remedy, for he admits that foreign nations and the Colonies know what is best for themselves, and urges that such of them as do not or will not comprehend the advantages of free trade, would speedily understand the disadvantages of a British retaliatory tariff. In an editorial on the subject *The Ironmonger* winds up by saying: "If we are in the wrong, by all means let us confess and rectify the error. If we find ourselves indubitably right, let us 'stick to our diggings' through thick and thin. In either case the less delay the better. Trade is worse than ever; commerce languishes; industry is at a standstill; and a large section of our population is on the verge of starvation. These are ample reasons for putting off the evil day no longer, and for disabusing ourselves of any politico-economic errors into which we may have fallen by way of inclination. It only remains, consequently, for somebody or other to assume the initiative. Who will do so?"

AMERICAN CASTINGS, RULES, LEVELS, ETC., are freely discussed in the current issue of the paper just named. The claim of American molders to the plate system is boldly disputed, while on the rule and level question John Rabone & Son (the leading English makers of those goods) throw down the gauntlet to all comers, especially to American manufacturers. They do not name the Stanley Rule and Level Company, but I surmise that they allude to that concern when they say that "there is at present but one firm of American rule makers whose goods are exported."

THE NEW WEIGHTS AND MEASURES ACT, which comes into operation Jan. 1, 1879, is causing a good deal of discussion—much of it wholly useless—and agitation. With a few minor exceptions, however, the act does nothing more than consolidate about 20 earlier statutes, its leading lines being strictly based on avoirdupois weights or their metric equivalents. On the same forthcoming date

A FURTHER RAILWAY REFORM

is promised us in the shape of stamps, value

2d. and 4d., wherewith respectively to prepay parcels of 2 lbs. and 4 lbs. between any of the stations of the 25 companies concerned in the arrangement. The issue of these stamps will be a great convenience to those who have to dispatch large numbers of small packages, but in reality the companies are not caring so much for the convenience of the public as for the furtherance of their hostility to the "packed parcel" carriers, who have long carried small parcels, &c., at lower rates than the railways by compressing all those destined for the same town into one large package, which they have sent by goods trains.

AT WALSHALL

a firm has booked a government order for 10,000 bed straps and 6100 sets of valise straps. From another Walsall manufacturer the hereditary princess of Saxe-Meiningen, granddaughter of Queen Victoria, has chosen a fine hunting saddle, exhibited at Paris.

FROM SCOTLAND

the current news is meager, owing to the weak state of the iron market. Warrants are quiet and are not likely to stiffen. In Connal's stores there are now 199,533 tons, as against 166,174 tons this date last year. The comparative shipments show a total falling off since January 1st last of 52,112 tons, and the imports of pig iron from Middlesbrough a decline of 8488 tons, on a total this year of 256,500 tons. Ballast pig rules 43/ alongside ship.

Writing from Glasgow on Nov. 23 James Watson & Co. said: The market has been dull since the date of our last, with a further decline in price of warrants, the demand for iron continuing very quiet. On Monday the quotations were 43/3 @ 43 1/2 cash. On Tuesday the market opened at 43 1/2 cash, gradually declining until 42 1/2 cash was accepted on Thursday, closing rather firmer in the afternoon at 42/9 cash. To-day the price has been firmer, a large business being done at 42 1/8 @ 42 10/8 cash, closing easier, sellers 42/9 per ton, buyers very near. Shipments last week were 7512 tons as compared with 7369 tons for the corresponding week of 1877. We quote:

	No. 1.	No. 2.
G. M. B. at Glasgow	44/6	43/
Garriherrie	43/	42/
Coltness	43/	42/
Summerlee	43/	42/
Langloan	43/	42/
Cambridge	43/	42/
Calder, at Port Dundas	43/	42/
Glenrock, at Ardrossan	43/	42/
Eglington	43/	42/
Dalmellington	43/	42/
Shotts, at Leith	43/	42/
Kinnell, at Bo'ness	43/	42/

The foundries and malleable works are still moderately engaged. Stewart's are doing well and Alley & McLellavare completing their contract for the pipes, &c., of the Lahore (India) Water Works.

IN AND AROUND SHEFFIELD

the distress of which I have spoken in my previous letters is fast becoming wider and deeper. The condition of the iron trade proper is in every sense of the word deplorable, and there is every reason for supposing that there will be no improvement this year, perhaps not during the first three or four months of 1879. In the eastern parts of the town, where the iron workers and coal miners reside, there are no fewer than 4000 untenanted dwellings. Already two or three deaths from alleged starvation have been reported and may probably in reality have been so caused. A good deal of nonsense has been and is being written on the subject, but my own personal knowledge convinces me that the distress is really most serious, and that should the winter prove of even ordinary severity the unemployed men and their families will have a terrible struggle for life. In the lighter branches of trade there is more work being done, but wages are very low indeed, so low indeed that one wonders how cutlers and others can possibly keep body and soul—to say nothing of wives and families—together on 15/ @ 20/ a week. They do it nevertheless, but how I, at least, confess my ignorance.

THE USE OF STEEL

of one kind or other, but mainly Bessemer, is constantly growing, and is of itself one of the most potent causes of the distressed state of the iron industries. While there is on all sides an almost universal chorus of groans from the ironmasters, we hear no complaints worth naming from the Bessemer men. They have a pretty fair amount of work in hand and have orders on their books for more, not merely for rails, but for a considerable quantity of blooms, ingots, bars, sheets, hoops, &c. At Dronfield, Wilson & Cammell are running on a good order for India, while Brown, Bayley & Dixons are working off Russian orders. Steel, Tozer & Hampton are going on home account, and Charles Cammell & Co. for home and Russian lines. John Brown's are "out of" the rail branch just now, and if what I hear be all true, Samuel Fox & Co. are not over-busy therein. For fine rolling, nevertheless, I am open to "back" Fox's against any local competitor. The Sheffield wire works are doing moderately well, William Cook & Co., Limited, having just secured an order for £12,000 worth of telegraph wire.

IN STAFFORDSHIRE

there has been no material change during the past week in either direction. Only the very best establishments are doing anything worth naming. At Lord Dudley's Round Oak Works there are now three Casson-Dormoy furnaces in operation. The three last week produced over 119 tons, and one alone 40 tons 1 cwt. 3 qrs. 24 lbs. At other large works the same furnaces are likewise being tried with promising success. Prices of iron do not change officially, but the underselling to which I have so frequently alluded is in great force, and must sooner or later cause financial disasters in several quarters. Rumor is already busy in one quarter. Hardware goods are in fair demand—indeed, in this respect the official export returns prove to demonstration that so far as quantities are concerned we are doing fairly well—the falling off in which is the source of so much woful talk being chiefly in respect of values. Most of the lighter trades of "old Brum" are moderately well engaged, in spite of hostile tariffs and other deterrent influences. In seamless tubes French competition is alluded

to in respectful terms, and the processes in use in France are spoken of as being likely to be introduced into Birmingham. Generally speaking, hardware prices are low and subject to special shading where large orders are in question.

IN SOUTH WALES AND MONMOUTHSHIRE

trade is quite as dull as in other parts of the country—indeed, the iron works are so badly off for work that there is certain to be serious distress among the workmen before long. Last week Downais shipped 1796 tons of rails to Lyttleton, New Zealand—the only notable consignment of the period, with the exception of a clearance of 1850 tons of railway iron to Kurrachee. Into both Cardiff and Newport considerable quantities of iron ore, mostly Spanish, are being imported. In Swansea and its vicinity the tin plate works are stated to be decidedly "busier," a result which is, whether correctly or otherwise I cannot say, attributed to the embolism of the recently resolved policy of restricting the production. To some extent, too, the higher prices may probably be owing to the advance in the cost of tin. A correspondent, writing to me from Swansea, says we may look for still higher quotations.

THE METAL MARKETS

are fairly even, tin being especially well sustained. The German, Austrian and Dutch markets are in sympathy with our own as to prices, but in none have there been any large sales. The *Ironmonger* reports: "Copper.—Five hundred and twenty tons Cape ores were sold by tender on Thursday at about 11/10 per unit for 32 1/2 % produce. The particulars of Burra for sale on the 26th inst. are: 100 tons cake and 107 tons ingot. Some inquiry for Chili bars, and business reported at £59 @ £59. 10/ for good ordinary brands and named brands, spot, and £59. 5/ @ £59. 10/ for forward and arrival. Wallaroo quoted £68 @ £69; Burra, £66 @ £66. 10/; English tough, £64. 10/ @ £65. 10/; best selected, £65. 10/ @ £66. 10/; and strong sheets, £70. Australian unchanged. Tin is steady, with a moderate business doing at £63. 10/ for fine foreign. English ingots from £67 @ £68. Tin Plates.—Prices remain fairly steady for coke quality, which are selling largely for the United States. The French demand is quiet, and generally speaking charcoal descriptions are not moving off very freely. Lead remains without alteration, English pigs selling at from £14. 17/ @ £15. 5/ and soft Spanish, without silver, at £14. 15/ Zinc sells at from £20 @ £20. 2/6 per ton, showing no material alteration in price. Spelter is quoted at £16. 15/ for ordinary brands; Quicksilver at from £6. 10/ @ £6. 12/6; and Antimony at £48 @ £49; 340 packages of Japan ore have been withdrawn. The official report of the London Metal Exchange was: Copper without material alteration; G. O. B. Chili bars, £58. 10/ @ £59; Wallaroo, £67. 10/ @ £68; Burra, £66; English tough, £64 @ £65; best selected, £65 @ £66; strong sheets, £70. Tin firmer; fine foreign, £63. 10/ @ £63. 15/; small business thereat; English ingot, £67 @ £68. Iron.—Scotch pigs, 42/9, cash buyers. Lead.—English pig, £14. 15/ @ £15. 2/6; soft Spanish without silver, £14. 17/6. Spelter, £16. 10/ @ £16. 15/ for ordinary brands. Zinc.—No sales. Quicksilver, £6. 10/ @ £6. 12/6. Antimony, £48.

Writing from Liverpool Messrs. Harrington, Horan & Co. said: During the past fortnight considerable sales of Chili bars have been made at £57 @ £61 per ton, and there is still a fair inquiry for distant arrival parcels on speculative account. Chili copper charters for the second half of October were 2600 tons, consisting of 1300 tons bars and 1300 tons ore and regulus for England, and 250 tons bars for the Continent. In furnace material, 393 tons regulus sold at 11/6 @ 12/; 634 tons Bolivian ore, 400 tons Mexican ore, 1200 tons New Quebrada ore, at 11/ @ unit; and about 900 tons English and Spanish precipitate, at 11/6 @ 11/7 1/2 unit. English copper is in good request, and large transactions in unmanufactured are reported at £64

INDUSTRIAL ITEMS.

MAINE.

About 700 tons of ore has been hauled to the furnace of the Katahdin Iron Works, in Piscataquis county, and blowing has been resumed. This ore is regarded as the best that has been taken out.

MASSACHUSETTS.

The Fitchburg Railroad Co. have adopted the Ashton noiseless safety valves, and are applying them to all their engines.

A corundum wheel, manufactured by F. B. Norton, of Worcester, which the Hood Company used in grinding grooves on pistol work in their establishment at Norwich, Conn., ground 300 grooves and was then sent back to Mr. Norton as a curiosity. It was 1 1/2 inches in diameter at the outset, and is fully 1 1/2 inches in diameter now.

NEW YORK.

The Buffalo Courier says: We are informed that a very extensive English manufacturing company is investigating Buffalo as a location for a branch establishment. This company propose to meet American competition by manufacturing here, and we trust that this city will be the locality selected.

H. R. Worthington is building the second compound duplex pump for the Albany and Rensselaer Iron and Steel Works; also the sixth duplex pump for the United Pipe Line of Bradford, Pa.

Five of Corcoran's largest windmills were shipped last week—three for Havana on the steamer City of Washington; one for Matanzas, and another for Cardenas. They are to raise water for plantation purposes. The largest, 24 feet in diameter, with a tower 50 feet high, is designed for a well 222 feet in depth.

NEW JERSEY.

The sale of the extensive foundry and iron works of Jesse W. Starr & Son, at Camden, which had been fixed to come off recently, has been indefinitely postponed, an injunction having been served on the late Sheriff Daubman, restraining further proceedings. An impression prevails that the business affairs of the concern will soon be adjusted in such a way as to avoid a sale altogether.

PENNSYLVANIA.

The new iron steamship State of California, built for the Pacific Coast Steamship Company, was successfully launched at high water on Dec. 5, from the shipyard of the Messrs. Cramps, at Kensington. The California, which is built under the rules of the British Lloyd's, is 320 feet long, 37 feet beam and 26 feet depth of hold.

The Glendower Iron Works at Danville are engaged in making rails for export to Cuba.

The Stewart Iron Company's furnace at Sharon made another big run of iron during the month of November, having produced 1400 tons of Bessemer iron, a daily average of more than 50 tons.

The report that the Baldwin Locomotive Works were about to remove from Philadelphia is emphatically denied by Mr. John H. Converse, an official of that company.

The Allentown Iron Company lays its failure to the anthracite coal combination's high prices for fuel; but the combination people say it was the low price of iron that did it.

The stockholders of the Co-operative Iron and Steel Works, Danville, met on Monday of last week and elected the following board of directors: Peter Baldy, Jr., L. K. Rishel, W. R. Williams, A. J. Ammerman, Daniel De Long, E. W. Conkling, Perry Deen, John H. Grove, J. C. Rhodes, Jacob Sechler, Sr., and Egbert Thompson.

We take the following from the Sharon Herald of the 5th inst.: At the New Mill every wheel in the building is in motion the present week. On last Monday the men held another meeting, at which it was determined to resume work; so on Tuesday morning the puddle mill went on double turn. On Wednesday morning the guide mill went on double turn and the nail plate mill run the two last days of the week, so as to have stock for the nail factory to begin with on Monday, and now—Monday of the present week—everything is in motion (the greater portion double turn) and likely to stay in motion all winter. The blast will be put on Keel Ridge Furnace by Thursday or Friday. Sheet, guide and hoop mills double turn; bar mill single turn; nail factory and plate mill off; both railroad spike machines on; chain factory, all its fires on. Blast Furnace No. 2 still keeping up the old tune of first-rate-and-a-half. Stewart Furnace No. 1 still doing well, as last reported. At West Middlesex, Mr. Owens got his gas furnace in operation on Friday. It appears to give satisfaction. No talk—not even a rumor—of any of the Shenango furnaces going in.

PITTSBURGH AND VICINITY.

A new wrought-iron bridge will be constructed over the Allegheny River at Franklin, next spring. The Morse Bridge Company of Youngstown, Ohio, have the contract.

Totten & Co. of Pittsburgh report that they have received their third order for nail machines from England.

Messrs. Wilson & Bailey, the well-known pig iron dealers of Pittsburgh, have removed their office to No. 88 Fourth avenue, over the Tradesmen's National Bank.

About two weeks ago a number of furniture makers decided to organize a co-operative company and run a factory of their own. The project took well. Last week another meeting was held, a constitution and by-laws adopted and officers elected. Shares are placed at \$100 each, and no one is allowed to take over \$1000, unless it be as reserve shares, which will draw no dividends. Already \$25,000 worth have been subscribed for, and there is every prospect that the project will be a complete success. It is proposed to purchase a factory that is already in operation, either in Pittsburgh or Allegheny. Arrangements are now being made for procuring machinery from the East, and it is expected that the factory will be in operation by New Year's.

MARYLAND.

Irvin & Co., of Baltimore, agents for the anchor nail, &c., report about 60 tons of nails behind their orders and about 80 tons in guide iron.

Messrs. Troxell, Handy & Greer, Baltimore, report a good trade, and many orders for future delivery.

WEST VIRGINIA.

Messrs. Joseph Bell & Co., of Wheeling, have added quite an improvement to their well-known cooking stoves, in the shape of a fender or bench attached to the oven door where victuals can be kept warm.

OHIO.

Messrs. H. L. Shepherd & Co., of Cincinnati, manufacturers of the Shepherd lathe, have taken the large foundry and machine shops formerly occupied by Warneford, Foley & Co., at Nos. 331 to 337 West Front street, and are putting in new boilers and extra shafting. The floor of this foundry is 100 by 167 feet, and the machine shops and wareroom are large. They removed from their old works, on Elm street, on a Saturday night, after having run down a heat, and on Monday following they were ready to run a heat at the new place. This was a feat worthy of notice from the fact that they had a considerable amount of machinery, including engine and boilers, to remove. Their works are now running full, with large orders awaiting fulfillment, some of which are from Russia, England, Norway and New Zealand. They will largely increase their force of hands next year.

It is stated in the Cleveland Trade Review that the Cleveland Rolling Mills Company are now putting up a new wire-rolling machine—a German invention—by means of which at least one-third of the labor ordinarily required for such work is saved. For some reason the matter is kept as secret as possible, no one being allowed about the machine except the workmen engaged upon it and one foreman.

A portion of the Aetna Mill, at Newburg, is now in operation making soft steel barrel hoops. From 25 to 30 men are employed, and from 12 to 15 tons of hoops turned out daily.

John L. Gill, of Columbus, is building cars for the following narrow-gauge roads: Georgetown, of Texas; College Hill, Cincinnati; Toledo, Delphos and Indianapolis; Delphos, Bluffton and Frankfort. He is also making 100-car wheels a day, and reports the outlook as good.

The new open-hearth Siemens steel furnace at the Burgess Steel Works, at Portsmouth, commenced operations Monday, the 2d inst.

Himrod Furnace No. 2, Youngstown, turned out last month, ending with Saturday, 1937 tons, mostly foundry iron. This is the biggest yield ever made by this or any other furnace in the valley.

The new Enterprise Mill, at Youngstown, has been idle in all its departments since Thursday noon of last week. The old mill is in full blast.

ILLINOIS.

Mr. L. H. Watson, machinist, of Chicago, exhibited at the Chicago Exposition this fall a very handsome portable upright engine 16-horse power, with automatic cut-off, having no belts. This engine attracted considerable notice. Mr. Watson is now running his works with a full complement of hands working at the rate of 14 hours per day upon engines and other machinery.

The Joliet Iron and Steel Works have melted 18,822,125 pounds of metal during the past month.

At a recent meeting of the stockholders of the Centralia Iron and Nail Works the capital stock of the company was increased from \$34,000 to \$60,000; 250 shares of stock voted and not one against the proposition. It is expected that the company will begin the manufacture of nails some time in January.

The Union Rolling Mills and the North Chicago Rolling Mills are now running in full blast. The latter establishment during the last few weeks has taken on over 400 additional hands, and is employing upward of 700 men. The Union Company have also largely increased their force. Both are turning out daily thousands of tons of railroad iron. The Bay View Works at Milwaukee, which have been consolidated with the North Chicago Company, are to be pushed to their fullest capacity.

INDIANA.

The Hagan Car Works at Terre Haute have built 1500 freight cars this year.

KENTUCKY.

There is no probability whatsoever that the Norton Iron Works at Ashland will resume general operations before half a year. They have now 3800 tons of pig metal on hand, which will furnish their nail mill a four months' job, and as this department will likely not be started before next spring it will not be necessary to start their furnace before the middle of next summer. In the meantime their numerous employees have a somewhat gloomy outlook for the immediate future.—Greenup Independent.

Mount Savage Furnace has commenced chopping for another blast.

The Ashland Furnace is working well, making a good quality of foundry iron and about 40 tons every 24 hours.

Nearly 12,000 cords of wood will be chopped and charred for Hunnewell Furnace the coming winter and summer.

Charlotte Furnace, which will not blow out before the 10th of January, has decided to make another blast and has commenced cutting wood to manufacture 2500 tons of pig iron next year.

Hunnewell, Pennsylvania and Mt. Savage will blow out this week.

The property of the Boone Furnace passed into the hands of the new receiver, John G. Peebles, of Portsmouth, a few days ago. The property has been involved in law for several years.

An item is "going the rounds" to the effect that the first blast furnace in Allegheny county, Pa., was built in 1859. According to Mr. Swank's "Iron Making in Pennsylvania," the first furnace was built at Shady Side, probably in 1792, and abandoned in 1794. The metal produced was used in casting stoves, grates and hollow-ware. The ruins of the furnace were visible as late as 1850. The first furnace now standing and in operation in Allegheny county, the Clinton, was built in 1859, and this is probably what is meant in the item quoted.

Drawbacks on Damaged Imports.

The Secretary of the Treasury has issued the following circular to Customs officers, explaining certain instructions in reference to the examination of imported merchandise on which allowance is claimed for damage occurring on the voyage. The circular says:

Article 511 of the regulations and decision 3636 of July 6, 1878, require the actual opening and examination of each and every package of merchandise on which allowance is claimed for damage occurring on the voyage of importation before any abatement of duties on account of such damage can be granted. These instructions were intended as a general rule for the guidance of Customs officers, and were designed to protect the revenue from allowances for merely speculative damage. The experience of the Customs officers at many of the principal ports has shown that an enforcement of the order of July 6, as to some classes of goods, is not actually necessary to enable them to obtain a knowledge of the extent of the damage which the merchandise embraced in the importation has sustained on the voyage, while a strict enforcement of the order increases the damage to the goods and causes great delay and expense to the parties interested. The following classes of goods are therefore excepted from the order mentioned: Green and dried fruits in packages; sardines, pickles, and other articles in sealed packages; pepper, pimento, and mace; macaroni; soda-ash and caustic soda; sugar in mats or bags; rice in bags. Of green fruit, not less than 10 per cent. of the packages, of each mark on the invoice, shall be opened and examined. Of sardines, pickles, sauces and other like articles in sealed bottles, jars, or cans, not less than 10 per cent. of the outer packages shall be opened and examined, but the number of bottles, jars, &c., which shall be opened is left to the discretion of the appraiser. Of the other articles mentioned, not less than 10 per cent. of the packages shall be opened, but the examination of a greater number is left to the judgment of the appraiser. In no case, however, will the selection of the packages to be opened be made by any other person than the officers of the appraiser's department. Sugar in packages, and pepper in bags, may be examined by taking proper samples from the packages by means of triers, where such mode of examination is practicable.

Reciprocal Free Trade.

The London Mining Journal publishes the following significant article:

When the free-trade policy which has well-nigh ruined the commercial interests of this country had been but very partially adopted, it was strenuously urged by the Conservatives, and notably by Mr. Benjamin Disraeli, that, although there was nothing objectionable in free trade in the abstract, it would inevitably ruin our home trade unless we had a care that in opening a market in Great Britain for the foreign producer we at the same time secured a market in the country to which such foreign producer belonged, for an equivalent amount of something which we produced ourselves; it was Mr. Disraeli who declared that free trade with reciprocity was the only principle that ought to be accepted by the British nation. The accuracy of this view was ignored at the time by the Liberal party in general, and by the Manchester school of political economists in particular, but now that a quarter of a century has passed and England has had experience of the working of the Manchester system, the absurdity of unrestricted free trade has become too evident, and the utmost care will now be necessary to prevent a return to that antiquated system of protection which would be altogether incompatible with present progress, or, what would be infinitely worse than the protective system of half a century ago, the adoption of the principle of retaliatory export duties which have the indisputable objection of shutting up home trade with foreign markets in order to counteract the legislation of a single competing country.

It has already been pointed out in the Mining Journal that British iron manufacturers have themselves closed more than one foreign market by their disreputable principle of sacrificing both quality and utility in order successfully to compete with regard to price; and what has been said of iron manufacturers applies with equal force to the manufacturers not only of steel and other metallurgical productions, but to every branch of industry, and as a consequence Great Britain has lost her reputation for quality and solidity, while, as a result of the Liberal free trade policy which has given to foreigners not only our best machinery, but also our best machine tools, those whom free trade temporarily secured as customers for British producers are now able to produce for themselves at a price which excludes us altogether.

The necessity of reciprocity is now most severely felt, and it is very generally considered that the present system must be changed. Referring to the subject, Mr. Peter Watson remarks with regard to the mining interests, that already there is a loud cry beginning for legislative protection for our home produce and industries, and no wonder, he continues, "when we see the counties of Cornwall and Devonshire, the two richest mineral counties, almost annihilated by the stoppage of nearly all the copper, tin and lead mines. The highest price of copper a few years ago was at £150 to £170 per ton, but through the large importation of foreign copper has gradually fallen to £55 to £60 per ton. Tin, which was once at £150 to £155 per ton, has in the like manner fallen to £55 to £60 per ton. Lead also from £25 to £15 per ton. Iron of various descriptions, and manufactured iron goods, are now sent into this country cheaper than we can make them."

And other nations have made, and are still making, such rapid progress that if free trade is to continue we must have some reciprocity treaty carried out if the produce and trade of this country is to again become remunerative. Why, for instance, should we ship lead to New York, and on landing it there to be charged a duty of £4 per ton, while on the other hand the Americans and other nations deliver their lead here free? What are our Cornish representatives and others

in Parliament doing who ought to be looking after the mineral producers' interests of this country being protected from free importation by insisting on strict and just improved treaties being carried out? Let the misnomer in future be corrected, and call the modern commercial policy free importation and not free trade. Now, reciprocity, if practicable, would no doubt to a considerable extent remove the difficulties of which so many are at present complaining, but to secure a reciprocity treaty involves—and it is useless to shut our eyes to the fact—inducing other nations to think as we do, which is often a long and difficult process, while the establishing of a protective duty enables the nation levying it to secure its object at its own discretion. As compared with export duties, protective duties have unquestionable advantages, since they enable us to give the importer the power to supply us cheaply with precisely those articles which we most want.

The question of protective tariffs has been very fairly discussed by Mr. David MacIver in a communication to the Times, in which he remarks that the most ardent free-trading theorist would, he supposes, admit that the protective tariffs of foreign nations, and in some of our own colonies, are injurious to the manufacturing interests of Great Britain. But he is prepared to go much further than this, because he entirely believes that those protective tariffs, if continued long enough, are not merely injurious to our home industries, but will come to mean the absolute extinction—so far as manufacturers are concerned—of our export trade. Nor does he think that foreign nations or the colonies are at all likely, of their own accord, to modify those tariffs to our advantage, because he believes that protectionist nations are not such fools as our British political economist would have us believe them to be. It seems to him that these foreign and colonial gentlemen for the most part understand their own interests perfectly, and that we may reason with them until doomsday without any result so far as the advancement of free-trade principles is concerned. Mr. MacIver very fairly points out that those countries will adopt or reject free trade as it suits them, and that they are perfectly able to judge for themselves in the matter without any assistance from us. Anything more puerile than the memorial of the British Iron Trade Association to the Belgian government can scarcely be imagined, and it must certainly have afforded vast amusement to those who had to receive it. Its presentation was about equivalent to a deputation of Bulgarian lawyers presenting a memorial to the British Home Secretary pointing out to him the advantage of abolishing trial by jury and repealing the Judicature acts. There can be no doubt that Mr. MacIver is not incorrect when he says that "in plain truth our British political economists fail to understand that the laws of trade include elements which their theories have not yet grasped. Certain things ought to be, according to theory, which nevertheless are not, so called political economy to the contrary notwithstanding. Our teachers have, I think, still something to learn, but, as seems to me, it is at least quite clear that free-trade theories have in practice completely broken down."

As to the prosperity of French commerce there can be no doubt. It is difficult in Paris, in Lyons, in Rouen, or elsewhere to find a commercial man who does not freely acknowledge that business is at the present time more prosperous than at any time since the days of the empire, and such an admission from Frenchmen means a great deal. Mr. MacIver states that his business friends tell him that American commerce is not so depressed as our own, and that even in Russia trade is better than with us. Yet Mr. MacIver is not against free trade, although he wants, as many others want, to see reciprocity in trade, but he does not believe that "we shall ever get it by talking political economy to our trading competitors." Foreign nations have less to gain from free trade than we have. It is a matter of business; and if we want real free trade—as assuredly we do—we must go beyond the present teaching of British political economy, and make it the interest of those who now exclude our manufactures to adopt a different policy. Our foreign friends who decline to understand the advantages that free trade offers would understand at once the disadvantages under which a British retaliatory tariff would place them. Mr. MacIver does not advocate prohibitory tariffs, but merely sufficient to turn the scale in favor of purchasing from such nations as might be willing to accept British manufactures in payment for their productions. We ought, says MacIver in conclusion, to face our national position in a business-like way, as any business man would in his own affairs; to realize that in adopting free trade without reciprocity a mistake has been made, and that our path cannot be too soon retraced. Once admit the principle that retaliatory tariffs may lawfully be used "as a means to an end," and there need be no difficulty in again finding markets for British manufactures, nor in so working our fiscal system as to strengthen the commercial ties with those magnificent colonies which he trusts may long form with Great Britain one great united empire.

The causes which led to free trade in Great Britain have been concisely and accurately given in a tract recently issued by

the American Iron and Steel Association, wherein, quoting from a paper "On the Patriotism of Tariff Protection," by Mr. Joseph Wharton, it is stated that "a nation's chief duty is to attend scrupulously to its own welfare. It is to pursue its own ends by its own means, strenuously perfecting its organic law and enhancing its internal vigor, while also growing outwardly so far as it may do so with prudence and without trenching on the rights or meddling with the affairs of others. The system of regulating the commerce and influencing the industry of a nation by import duties, while at the same time replenishing its treasury, has grown up by slow degrees to such completeness as we now find covering each nation as the skin covers each animal; it is an integral part of the plan of government in every country that is even slightly raised above barbarism; to abandon it would be not merely to renounce an important part of the public revenue, but would also leave to chance, or rather to the mercy of rivals or enemies, the maintenance of industries necessary to independence. It would, at the same time, be an abandonment by any nation not already at the head of all to attempt to reach equality with other nations in the difficult but lucrative and constantly advancing arts of modern civilization." It is generally felt in America that the revival of business, which has now unquestionably set in there, is due to the extension of the protective policy, and it may fairly be concluded that until in this country liberal free trade is at least replaced by reciprocal free trade, no permanent improvement in trade can reasonably be hoped for.

The Ownership of the Adams Nickel-Plating Patent.

Those who are watching with interest the progress of suits involving the validity of the Adams patent for nickel-plating, will also be interested in knowing that its ownership is a matter of question. The Boston Traveller of Dec. 6 publishes the following:

The question of the validity of the patents for nickel-plating, which has occupied the attention of the U. S. courts now for eight or nine years, would appear to have been settled by numerous decisions of judges in different circuits throughout the country in favor of the patentee and his assigns. But the vast interest involved, estimated by Senator Conkling in his argument in a now pending New York case at from \$50,000,000 to \$75,000,000, will not permit those using the process without license from the owner of the patent to suffer it to rest without further contest, and they seem determined to force the case to a final decision by appeal to the Supreme Court of the United States, however small their chance may seem in view of the opinion given by the numerous U. S. Circuit judges.

The interest in these suits is further enlivened by a contest between two rival companies, both claiming under the Adams patents and through them, viz., the American Nickel Plating Company and the National Nickel Plating Association, whose interests are in common, and the United Nickel Company. The company first named is composed of prominent and wealthy citizens of New York and Boston, who formed the American in 1866 and purchased the Adams patent, and have subsequently acquired further interests in his invention.

The other, the United, is composed also of prominent men of New York, and was organized about three months after, under the same patents, it is claimed, and another patent which has since been pronounced invalid.

These two companies are pressing their claims with all the vigor which such vast prospective revenues to the winning party naturally would call forth. A test case was argued at the present term of the U. S. Circuit Court, Judge Lowell presiding, the Hon. E. N. Dickinson presenting the case for the United and Gen. Butler for the American and the National. The case lasted through two days, and was listened to with much attention by the numerous interested parties.

The decision will be awaited with great interest by the parties to the controversy and those carrying on the nickel-plating business. The last-mentioned suit is of great importance, to nickel platers especially, as the patents being sustained the question arises, to whom shall they pay royalties? Paying to the losing party, they are liable to pay over again to the one gaining the suit.

The American and the National have already published a caution to those liable to be interested against paying for licenses or back royalties to any company but themselves. We may expect a counter caution from the United. Meantime all must wait the slow, stern decree of the law.

Labor Notes.—The miners at Nations, Pa., are paid 13 cents per car for mining coal. By the suspension of work in the coal mines of the middle coal fields, Pennsylvania, between 20,000 and 30,000 miners are thrown idle and much suffering caused.

On the 1st of November a notice of a five-cent reduction was served on Lee & Patterson's miners, at Clinton, Pa., by their superintendent, to take effect on that day. The miners have held several meetings in regard to accepting the reduction, and have finally concluded to do so.



AMERICAN SCREW CO.,

Providence, R. I.,

**MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,
AND INCREASING THE ASSORTMENT DAILY.**

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION. PHILADELPHIA, 1876.

(No. 235.)

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

PHILADELPHIA, November 8, 1876.

REPORT ON AWARDS.

Product: **Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.**

Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: **Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.**

G. L. REED, Signature of the Judge.

Approval of Group Judges.

Daniel Steinmetz,
Jas. Bair,
Chas. Staples,

G. L. Reed,
J. D. Imboden,

J. Diffenbach,
Dav. McHardy.

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards,
Given by authority of the United States Centennial Commission.

[L.S.] J. L. CAMPBELL, Secretary.

A. T. GOSHORN, Director-General.
J. R. HAWLEY, President.



After forty years' experience we offer to the trade our Centennial Screws, patented May 20, 1876, as the best we have ever known.

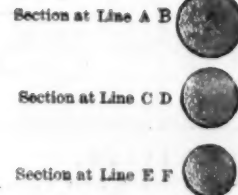
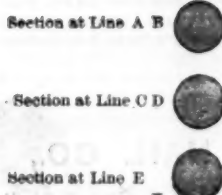
The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the wear point of screws, as formerly made, is at the heel of the thread, where all



Estimated to be FIFTY PER CENT. stronger than a Screw as Commonly made.

the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

The Iron Age Directory

and Index to Advertisements.

AGRICULTURAL IMPLEMENTS.	PAGE
Hubbard H. N., 323 E. 2nd, N. Y.	24
ALF COMPRESSORS.	
Clayton, James 11 Water, Brooklyn, N. Y.	3
ALARM MACHINES.	
Tucker & Dorsey, Indianapolis, Ind.	30
ANTI-FRICTION METALS.	
Reeves Paul S., Philadelphia.	36
ANTI-INCURSTION.	
S. B. Briscoe, Philadelphia.	36
ANYLIS, MANUFACTURERS OF.	
Fisher & Norris, Trenton, N. J.	31
Richardson Mfg. Co., Worcester, Mass.	31
ANGERS, BITS, ETC., MANUFACTURERS OF.	
Clark Wm. A. & Co., 113 South, Conn. Valley Bldg. Co., 58 Chambers, N. Y.	7
AXES, SPRINGS, ETC., MANUFACTURERS OF.	
Brown D. Arthur & Co., Fisherville, N. H.	35
Cook R. & Sons, Winsted, Conn.	35
Hotchkiss Guy C., Field & Co., Brooklyn, N. Y.	31
Sheldon & Co., Auburn, N. Y.	31
Wilson, Walker & Co., Pittsburgh, Pa.	5
BARB WIRE.	
Thorn Wire Hedge Co., 34 Canal, Chicago.	2
BELLOWS, MANUFACTURERS OF.	
Newcomb Bros., 58 Chambers, N. Y.	36
Scott Geo. M., Chicago, Ill.	36
BELLS (Sleigh).	
Berlin Bros. Mfg. Co., Easthampton, Conn.	28
BELTING, LEATHER, MAKERS OF.	
Alexander Bros., 412 N. 3d, Philadelphia.	31
Forepaugh Wm. H. & Co., 113 South, Conn. Valley Bldg. Co., 58 Chambers, N. Y.	7
BIRD CAGES, MAKERS OF.	
Lindehorn A. Co., 242 Pearl, N. Y.	3
Maxheimer John, 254 and 257 Pearl, N. Y.	3
BILT BRACES, MANUFACTURERS OF.	
Millers Falls Mfg. Co., 74 Chambers, N. Y.	31
BLIND STAPLES.	
Haigh J. Lloyd, 87 John, N. Y.	21
BLOCKS, TACKLE, MAKERS OF.	
Burr & Co., 35 Peck Slip, N. Y.	11
McMillan Wm. H. & Co., 113 South, Conn. Valley Bldg. Co., 58 Chambers, N. Y.	7
Penfield Block Works, Lockport, N. Y.	33
Providence Tool Co., Providence, R. I.	33
Walt John, 7 and 9 Bedford, N. Y.	33
BOLT CUTTERS.	
Howard Iron Works, Buffalo, N. Y.	34
Stockwell Screw and Machine Co., Cleveland, O.	34
Wiley & Russell, Greenfield, Mass.	34
BOLTS, CORRUGATED BELT.	
Rivet Buckets Co., Chicago, Ill.	33
BOLTS (Screw).	
Eagle Bolt Works, Philadelphia.	31
BOOTS AND SHOE HEEL STIFFENERS.	
Lyons N., Albany, N. Y.	13
BORAX.	
Coleman Wm. T. & Co., 120 Pearl, N. Y.	4
BRASS BUTTS, MAKERS OF.	
Tiebout W. J., 30 Pearl, N. Y.	13
BRASS, MANUFACTURERS OF.	
Ansonia Brass and Copper Co., 10 Cliff, N. Y.	2
Bridgeport Brass Co., Bridgeport, Conn.	2
Brass Goods Mfg. Co., 28 Pearl, N. Y.	3
David John & Sons, 10 John, N. Y.	2
Holmes & Butts & Haydens, 49 Chambers, N. Y.	2
Manhattan Brass Co., 82 Chambers, N. Y.	2
Plum & Atwood Mfg. Co., 20 Chambers, N. Y.	2
Seavill Mfg. Co., 421 Broome, N. Y.	2
Waterbury Brass Co., 26 Broadway, N. Y.	2
BRASS FOUNDRY.	
Reeves Paul S., Philadelphia.	36
BREAD MIXER AND KNEADER.	
Stanley Co., 75 High, Boston, Mass.	3
BRIDGE BUILDERS.	
Moseley Iron Bridge and Roof Co., 5 Day, N. Y.	33
BUCK SAWS.	
Boynton E. M., 80 Beekman, N. Y.	36
BUTCHER AND SHOE KNIVES, MANUFACTURERS OF.	
Wilson John, Sheffield, England.	29
BUTTS AND HINGES.	
American Spiral Spring Butt Co., 80 Beekman, N. Y.	36
Sabin Mfg. Co., Montpelier, Vt.	3
Stanley Works, New Britain, Conn.	3
Union Mfg. Co., 58 Chambers, N. Y.	2
CALIPERS.	
Victor Sewing Machine Co., Middletown, Conn.	30
CARRIAGE.	
Townsend, Wilson & Hubbard, Philadelphia.	12
CARRIAGE HARDWARE, MAKERS OF.	
Hayden & Smith, Auburn, N. Y.	12
Fin Richard P., Wilkesboro, N. C.	12
Smith H. D. & Co., Plantville, Conn.	12
Stratton C. & Co., 632 14th Ave., N. Y.	4
Wilcox & Howe, Birmingham, Conn.	4
CARRIAGE SPRINGS.	
Remond Treble Co. (Limited), Rome, N. Y.	28
Carver Spring Co., Hulton, Pa.	28
CAR AXLES.	
Robert A. P. & Co., 265 S. 4th, Philadelphia.	4
CASTERS.	
Phoenix Caster Co., Indianapolis, Ind.	30
CAULKING IRONS.	
Carver John, 28 Monroe, N. Y.	11
CHISELS, MANUFACTURERS OF.	
Buck Bros., Milbury, Conn.	33
CLOCKS, SPRINGS, ETC.	
Cary & Moon, 234 W. 29th, N. Y.	3
Dunbar Bros., Bristol, Conn.	29
CLOTHES PIN, (Metallic).	
Brower J. I. & Son, 226 Greenwich, N. Y.	32
COAL, MINERS OF.	
Pardee A. & Co., 111 Broadway, N. Y.	6
Tennepsee Coal & Co., 25 West, N. Y.	6
The Hoboken Coal Co., Jersey City, N. J.	6
COAL HODS.	
Esterbrook, Wm., Philadelphia, Pa.	24
Pierce Geo. N. & Co., Buffalo, N. Y.	24
COAL SICES.	
Viney Shepard & Co., Buffalo, N. Y.	27
COFFEE AND SPICE MILLS.	
Lane Brothers, Milbury, N. Y.	28
Enterprise Mfg. Co., Philadelphia.	23
COMPASSES AND DIVIDERS, MANUFACTURERS OF.	
Bemis & Call Hardw. & Tool Co., Springfield, Mass.	5
COOPERS' TOOLS, ETC., MANUFACTURERS OF.	
D. R. Barton Tool Co., Rochester, N. Y.	7
COPPER.	
The New Haven Copper Co., 255 Pearl, N. Y.	3
CORN HUSKERS.	
Chambers, Boring & Quinlan, Decatur, Ill.	28
CORN SHELLERS.	
Rumsey & Co., Seneca Falls, N. Y.	7
The Gould Mfg. Co., Seneca Falls, N. Y.	7
CORRUGATED IRON.	
Moseley Iron Bridge and Roof Co., 5 Day, N. Y.	33
CRACKLES, MANUFACTURERS OF.	
Wile, Siedel & Co., 709 Market, Phila.	33
CUPOLAS & BLOWERS.	
Smith & Sayre Mfg. Co., 21 Cortlandt st., N. Y.	34
CURRY COMBS.	
Lawrence Curry Comb Co., 323 2d Ave., N. Y.	34
CUTLERY, IMPORTERS OF.	
Boker Hermann & Co., 101 Duane, N. Y.	10
Clatworthy F. & W., 5 Chambers, N. Y.	10
Fisher Jos. S., 411 Commerce, Phila.	10
Friedmann & Lauterjung, 14 Warren, N. Y.	10
CUTLERY, MANUFACTURERS OF.	
Burkhardt Aaron, Peppercorn, Mass.	35
John Russell Cutlery Co., 90 Chambers, N. Y.	35
Mary Bros., 40 Beekman, N. Y.	35
Meriden Cutlery Co., 42 Chambers, N. Y.	35
Naugatuck Cutlery Co., 42 Chambers, N. Y.	35
Syracuse Cutlery Co., Syracuse, N. Y.	35
The Fray Cutlery Co., Bridgeport, Conn.	35
The Lamson & Goodnow Mfg. Co., 88 Chambers, N. Y.	35
DIFFERENTIAL PULLEY BLOCK.	
Yale Lock Mfg. Co., 13 Chambers, N. Y.	4
DINNER PAIL & LANTERNS.	
Haigh, Jos. Fortchester, N. Y.	12
DISCOUNT TABLES.	
Jennings S. H., Deep River, Conn.	16
DOOR AND GATE SPRINGS.	
Dunne P. R., 125 Fulton, N. Y.	36
Van Wagoner & Williams, 20 Beekman, N. Y.	36
DRILL CHUCKS, MANUFACTURERS OF.	
Cushman A. F., Hartford, Conn.	36
DRILLING MACHINES, MAKERS OF.	
Thorne, De Haven & Co., Philadelphia.	33
Wiley & Russell, Greenfield, Mass.	34
DROP FORGINGS.	
Roe Wm. & Bros., West Philadelphia, Pa.	5
Merrill C. & Sons, 55 Grand, N. Y.	5
DROP HAMMERS.	
The Selles & Parker Press Co., Middletown, Ct.	35
DROP PRESSES.	
Becher & Peck, New Haven, Conn.	34
EDGE TOOLS, MAKERS OF.	
Doe D. R., Barton Tool Co., Rochester, N. Y.	7
Doscher M., 18 Chambers, N. Y.	7
ELBOWS (STOVE PIPE).	
Hogan Elbow Co., Cleveland, Ohio.	35
ELEVATORS, MAKERS OF.	
Crane Iron, Mfg. Co., Chicago, Ill.	9
Stokes & Parrish, Philadelphia, Pa.	34
ELEVATOR BUCKETS.	
Rivet Buckets Co., Chicago, Ill.	33
Rowland T. F., Brooklyn, N. Y.	33
EMERY WHEELS.	
Lehigh Valley Emery Wheel Co., Weissport, Pa.	36
ENGINEERS, MACHINISTS, ETC.	
Southern States Coal, Iron & Land Co., South Pittsburg, Tenn.	6
Todd Joseph C., 10 Barclay, N. Y.	6

ENGINES (LOCOMOTIVE).	
Baldwin Locomotive Works, Philadelphia, Pa.	6
ENGINES, STEAM, MAKERS OF.	
Ervin Chas. W. & Co., Kensington, Phila.	34
Pittsburg Steam Engine Co., Pittsburgh, Pa.	34
Harris Wm. A., Providence, R. I.	34
Lewis F. F. & A. B., Lancaster, Pa.	34
Loverock & Co., Philadelphia, Pa.	34
Payne B. W. & Sons, Corning, N. Y.	34
Wetherill Robt., 30, Chester, Pa.	34
EXPORT FACTORIES.	
Jennings S. H., Deep River, Conn.	16
FAN BLOWERS.	
Landis E. F., Lancaster, Pa.	34
FAUCETS, BRASS, MAKERS OF.	
McNab & Harlin Mfg. Co., 6 John, N. Y.	34
FAUCETS, WOOD.	
Penfield Block Works, Lockport, N. Y.	33
FAUCETS, SELF-MEASURING, MAKERS OF.	
Enterprise Mfg. Co., Philadelphia, N. Y.	33
Lane Bros., Milbury, N. Y.	33
FENCE (Hurdle).	
Jacksonham J. B., 913 Cherry, Philadelphia.	4
FILLES, IMPORTERS OF.	
Carr J. & Riley, 87 John, N. Y.	28
Fisher Joseph S., 411 Commerce, Phila.	10
Moss F. W., 50 John, N. Y.	28
FILLES, MANUFACTURERS OF.	
Auburn Tool Works, 58 Chambers, N. Y.	7
Barnett G. & H., 41 and 43 Richmond, Phila.	8
Chalmers & Murray, 701 E. 12th, Phila.	8
Diston Henry & Sons, Phila.	34
Draper C. T. & Co., Sing Sing, N. Y.	36
Everhart James, N. Y.	36
Heller & Bros., Newark, N. J.	36
Johnson & Bro., 1 Commercial, Newark, N. J.	8
McCaffrey & Bro., 120 and 122 N. 4th, Phila.	8
New American File Co., Pawtucket, R. I.	8
Nicholson File Co., Providence, R. I.	30
Spencer L. R. & Son, Sheffield, England.	30
FIRE BRICK, MAKERS OF.	
Borgner & O'Brien, Philadelphia, Pa.	11
Brooklyn Clay Refractory and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	11
Gardner Brothers, Pittsburgh, Pa.	11
Hall A. & Sons, Philadelphia, N. Y.	11
Hall & Sons, Buffalo, N. Y.	11
Maurer Henry, 45 East 23d, N. Y.	11
Reichardt & Co., 45 West 23d, N. Y.	11
Newton & Co., Albany, N. Y.	11
Ostrander James & Son, Troy, N. Y.	11
Valentine M. D. & Bro., Woodbridge, N. J.	11
Watson John R., Perth Amboy, N. J.	11
FLINT AND EMERY PAPER AND CLOTH.	
Bader, Adamson & Co., 730 Market, Phila.	11
FLOATING IRONS.	
Weeks A. & S., 87 John, N. Y.	7
FLATING MACHINES.	
Shepard Hardware Co., Buffalo, N. Y.	3
The American Machine Co., Philadelphia.	21
Buffalo Forge Co., Buffalo, N. Y.	34
FORGES, PORTABLE, ETC.	
Keystone Portable Forge Co., Philadelphia, Pa.	12
Empire Portable Forge Co., Cohoes, N. Y.	12
Buffalo Forge Co., Buffalo, N. Y.	34
FOSSILLIFEROUS ORCS.	
Brown T. J., Rockwood, Tenn.	6
FOUNDRY FACINGS.	
Paxson J. W. & Co., 31 Beach, Phila.	5
Whitehead Bros., 17 E. 13th, N. Y.	5
FRICTION CLUTCH.	
Smith James & Co., 17 Market, Philadelphia.	32
FURNACES, MAKERS OF.	
Richmond Furnace Co., S. Fourth, Phila., Pa.	13
FURNACES (CHARCOAL).	
Mathieu Jean A., Room 2, 15 South 7th, Phila.	24
FURNITURE SPRINGS.	
Carey & Moon, 234 W. 29th, N. Y.	3
Halch Lloyd J., 87 John, N. Y.	3
GALVANIZED IRON.	
Lefferts Marshall, Jr., 90 Beekman, N. Y.	4
GIANT CRYSTAL PAPER.	
Penfield Block Works, Lockport, N. Y.	33
GOVERNORS.	
Judson Junius & Son, Rochester, N. Y.	35
GRINDSTONES.	
Wood H. S. & Co., 38 West, N. Y.	29
Wood Walter R., 23 and 25 Front, N. Y.	29
Worthington & Sons, North Amherst, O.	29
GUNS, ETC.	
Windmiller Louis & Roelker, 30 Reade, N. Y.	16
GUNPOWDER, MAKERS OF.	
Kneeland F. L. (Dupont) 70 Wall, N. Y.	16
Lafin & Rand Powder Co., 20 Murray, N. Y.	16
HANDLES, MAKERS OF.	
Handley & Hanks, 75 Reade, N. Y.	16
HARDWARE COMMISSION MERCHANTS.	
Graham & Haines, 113 Chambers, N. Y.	32
Handley & Hanks, 75 Reade, N. Y.	16
Samuel S. L., 57 Cedar, N. Y.	32
Walbridge G. B. & Co., 83 Reade, N. Y.	32
HARDWARE DEALERS.	
Lane & Boone, 127 Market, Phila.	10
Lloyd, Supple & Walton, 62 Market, Phila.	10
Shepard Sidney & Co., Buffalo, N. Y.	27
HARDWARE IMPORTERS.	
Boker Hermann & Co., 101 Duane, N. Y.	10
McCoy & Co., 131 and 133 Duane, N. Y.	10
Windmiller Louis & Roelker, 30 Reade, N. Y.	16
HARDWARE MANUFACTURERS.	
American Spiral Spring Butt Co., 80 Beekman, N. Y.	36
Coulter, Flagler & Co., 4 Chambers, N. Y.	32
Cowles Hardware Co., Conn.	32
Enterprise Mfg. Co., Phila.	23
Lloyd, Supple & Walton, 62 Market St., Phila.	10
Malby, Curdus Co., 34 Reade, N. Y.	10
Miller's Falls Mfg. Co., 74 Chambers, N. Y.	2
Payson & Co., Chicago, Ill.	12
Bliss Mfg. Co., Buffalo, N. Y.	12
Shepard Hardware Co., Buffalo, N. Y.	27
Stanley Works, New Britain, Conn.	3
Union Mfg. Co., 58 Chambers, N. Y.	2
Van Wagoner & Williams, 20 Beekman, N. Y.	36
HARDWARE SPECIALTIES.	
Many Francis 14 Chambers, N. Y.	36
Shepard Sidney & Co., Buffalo, N. Y.	27
Spencer & Underhill, 44 Chambers, N. Y.	27
HARNES SADDLES.	
Covert E. J. C., Farmer Village, N. Y.	20
HAY KNIVES.	
Holt Hiram & Co., East Wilton, Me.	8
HINGES.	
Lewis Oliver & Phillips, Pittsburgh, Pa.	6
Stanley Works, New Britain, Conn.	3
HOGS.	
The Sandusky Tool Co., Sandusky, O.	10
HOG RINGERS.	
Chambers, Boring & Quinlan, Decatur, Ill.	28
HOLDING ENGINES, MAKERS OF.	
Crane Bros. Mfg. Co., Chicago, Ill.	9
Davis A. J. & Co., Newark, N. J.	35
Mundy S. S., Newark, N. J.	35
HOLDING MACHINES.	
Harrington Edwin & Son, Philadelphia, Pa.	30
HOOKS (COFFIN & HALE).	
New York Handle & Mallet Works, 456 E. Houston.	13
HORSE CLIPPERS.	
Boker Hermann & Co., 101 & 102 Duane, N. Y.	10
J. J. Shannon, Philadelphia, Pa.	10
HORSE NAILS, MAKERS OF.	
Anvil Nail Co., 65 Washington, N. Y.	21
Globe Nail Co., Boston, Mass.	21
EP Horse Nail Co., Cleveland, O.	21
National Horse Nail Co., Vergennes, Vt.	21
Northwestern Horse Nail Co., Chicago, Ill.	21
Putnam Nail Co., Neponset, Mass.	21
Saranac Horse Nail Co., Plattsburg, N. Y.	21
HORSE SHOES, MAKERS OF.	
Burden Iron Works, Troy, N. Y.	10
Rhode Island Horse Shoe Co., Providence, R. I.	9
Schoenberger & Co., Pittsburgh, Pa.	9
HYDRANTS, ETC.	
McLean John, 300 Monroe, N. Y.	33
Mohawk & Hudson Mfg. Co., Waterford, N. Y.	33
HYDRAULIC JACKS.	
Dudgeon Richard, 24 Columbia, N. Y.	13
ICE CREEPERS.	
Childs, Groff & Co., Cleveland, O.	33
INSURANCE, BOLLER.	
Harford Steam Boller Inspection & Insurance Co.	35
IRON, CHARCOAL, WARM OR COLD BLAST.	
Quincy John W., 58 William, N. Y.	39
IRON COMMUNICATORS.	
Adams Hugh W., 55 Pine, N. Y.	29
Lowe S. R., Chattanooga, Tenn.	6
Spencer & Collins, St. Louis, Mo.	6
IRON, PIG, IMPORTERS OF.	
Williamson James & Co., 60 Wall, N. Y.	4
IRON DEALERS.	
Abel Brothers, 120 South, N. Y.	4
Bonelli, Botsford & Co., Youngstown, O.	4
Borden & Lovell, 70 and 72 West, N. Y.	4
Carmichael W. S., 130 and 132 Cedar, N. Y.	4
Cooney Daniel F., 8 Washington, N. Y.	4
Huerfied G., 99 Market Slip, N. Y.	4
Harrison & Gilson, 58 to 60 Water, N. Y.	4
J. B. Jackson & Co., 22 and 24 Franklin, N. Y.	4
Judson B. F., 47 and 49 Water, N. Y.	4
Lundberg Gustaf, 48 Kilby, Boston, Mass.	4
O'Brien & Wallace, 87, 89 and 91 Elm, N. Y.	4
Peterson & Co., 24 Broadway, N. Y.	4
Pullmann J. C., Philadelphia, Pa.	5
Quincy John W., 58 William, N. Y.	39
Richards D. W. & Co., 62 Mangin, N. Y.	16
Wallace Wm. H. & Co., Albany and Washington streets, N. Y.	4
Warner A. B. & Sons, 25 and 27 West, N. Y.	4
Williamson James & Co., 60 Wall, N. Y.	4
Whitney A. R., 25 Hudson, N. Y.	4
IRON, (MANUFACTURERS' AGENTS).	
Levis & Kimball, Philadelphia, Pa.	39
IRON, MANUFACTURERS.	
Albany & Rensselaer Iron & Steel Co., Troy, N. Y.	38
Bradley, Reis & Co., 23 Cliff, N. Y.	4
Burden Iron Works, Troy, N. Y.	10

F. HABERMAN,
MANUFACTURER OF
**STAMPED, JAPANNED & PLAIN
TINWARE**
AND
**PATENT CORRUGATED BOTTOM
Coal Hods,**
294 PEARL STREET, N. Y.

Special quotations made on all goods to buyers of large quantities.

ENTERPRISE Mfg. CO. of PA.
Patented Hardware Manufacturers and Iron Founders,
THIRD and DAUPHIN STS., PHILADELPHIA.



SPECIALTIES.
Enterprise Patent Cold Handle Double Pointed
SMOOTHING AND POLISHING IRONS,
CHAMPION TOBACCO CUTTERS,
PATENT MEASURING FAUCETS,
SELF-WEIGHING CHEESE KNIVES,
&c., &c.

SPECIALTIES.
AMERICAN
COFFEE, SPICE AND DRUG MILLS
SAUSAGE STUFFERS,
FRUIT, LARD AND JELLY PRESSES,
CHAMPION DRIED BEEF SHAVERS,
Coffee Roasters, Bung-Hole Boreers,
&c., &c.

The Stamped Stove Pipe Elbow,
HOGEN'S PAT

JESSOP'S Patent Adjustable Pipe Tongs.

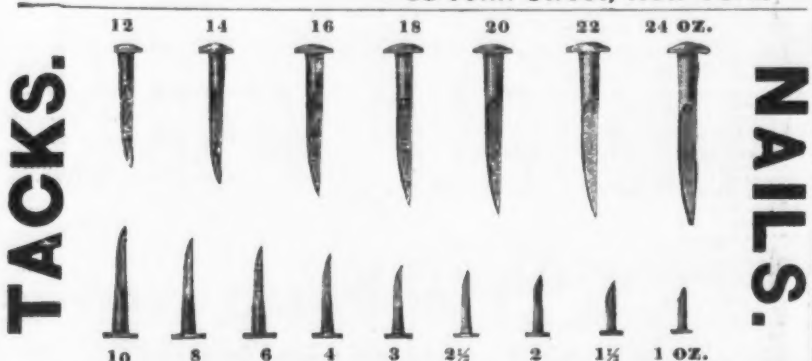


THE BEST IN THE MARKET.

Send for Samples.

EATON, COLE & BURNHAM COMPANY,
Sole Manufacturers,

58 John Street, New York.



TACKS. **NAILS.**
SWEDES IRON, UPHOLSTERERS', GIMP AND CUT TACKS.

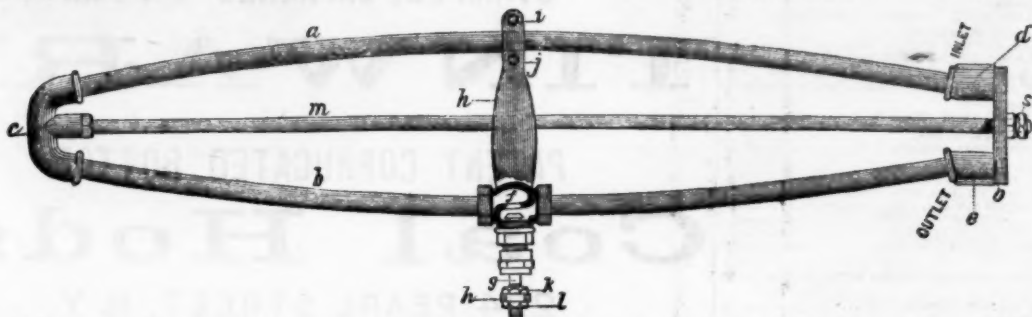
Tinned, Leathered and Large Head Iron Carpet Tacks.
TRUNK, CLOUT AND FINISHING NAILS, BRADS, PATENT BRADS, &c.
Lining, Saddle and Tufting Nails, Coffin Tacks and Tufting Buttons.
COPPER, ZINC, STEEL & SWEDES & COMMON IRON SHOE NAILS, &c.
Copper, Iron and Galvanized Boat Nails,
Regular or Chisel Pointed.

Wires and Iron Wire Nails, Moulding Nails & Escutcheon Pins, Chair & Cigar Box Nails, 2d & 3d Fine Nails, Roofing Tacks and Nails, &c., &c.
MADE BY THE

AMERICAN TACK CO., Fairhaven, Mass.

A full line of goods may be found at our
NEW YORK SALESROOM, No. 117 Chambers Street.

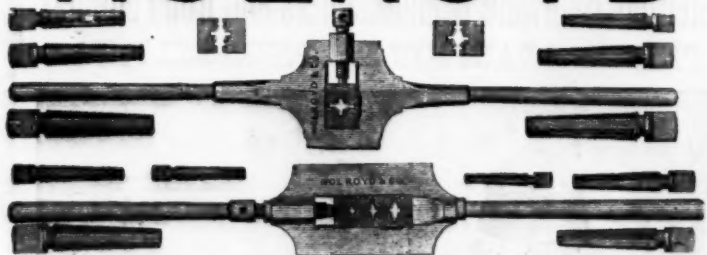
BARR'S ELLIPTIC STEAM TRAP.



Has no floats or concealed parts to get out of order. Can be set to discharge water at any desired temperature. Once adjusted, never needs the slightest attention, being ABSOLUTELY AUTOMATIC in action. Never FREEZES in exposed situations, such as Boiling Mills, Hammer Shops, &c. Simplest in construction of any trap made. Has no reservoir in which to accumulate condensation, but discharges incessantly. Can be set in any position, either side or end up, without altering its working. Occupies less space, and being so light, can be used in situations where no other can.
Send for Circular to manufacturers.

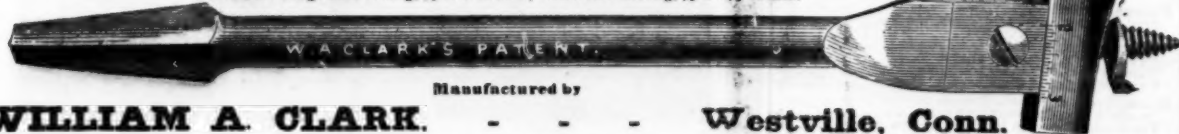
PANCOAST & MAULE, 243 and 245 South Third St., Philadelphia.

HOLROYD & CO., Waterford, N. Y.



CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.
Two sizes: Large Size Boring, 1/4 to 3 inches; Small Size Boring, 1/8 to 1 1/4 inches.

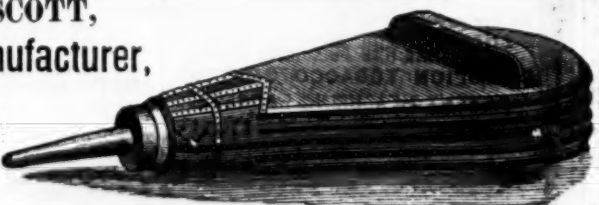


Manufactured by
WILLIAM A. CLARK.

Westville, Conn.

GEO. M. SCOTT,
Bellows Manufacturer,

Johnson Street,
Cor. 22d St.,
CHICAGO, ILL.



H. PRENTISS & COMPANY,

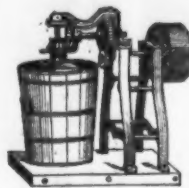
Sole Manufacturers of
Goddard's Patent-Relieved Machinists', Blacksmiths' and Gasfitters' Taps. Solid Reamers,
Screw Plates and Dies.



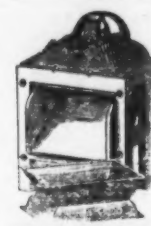
Headquarters for Billings & Spencer Co.'s
manufactures, Twist Drills, Chucks, Machine Set and Cap Screws, &c.
Dealers in Machinists' Supplies. 114 DEY STREET, New York.



HAND FREEZER.
2 to 25 qts.
\$3.50 to \$25.00



HAND OR POWER.
25 and 50 qts.
\$75.00 and \$175.00



HAND OR POWER.
ICE CRUSHER.
\$75.00

SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

Galvanized iron outside, tin inside. No secretions of oxide of zinc need be feared in the use of this Freezer. Simple in construction, perfect in results. Send for descriptive circular and discounts of this celebrated Freezer. Address
WHITE MOUNTAIN FREEZER CO., Laconia, N. H.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES

For STEAM, WATER and GAS.

Iron Pipe and Fittings, Plain and Galvanized.

PLUMBERS' MATERIALS.

New Illustrated Catalogue and Price List sent by express to the Trade on application.

Factory, Paterson, N. J.

56 John Street N. Y.

REMINGTON'S

"REMINGTON'S"

NEW LINE

REVOLVERS.



Full Nickel Plated.

Checked Rubber Stocks.

\$2.50, \$8.00, \$9.00.

22 Cal. 38 Cal. 41 Cal.

\$8.00, \$8.50, \$9.00.

30 Cal. 32 Cal. 38 Cal. With ejectors.

Best in Market. Discount to dealers only. Cut this out and send for illustrated wholesale catalogue and price lists of Guns, Rifles, Pistols, Ammunition, &c., &c. Address
E. REMINGTON & SONS,
P. O. Box 3994. 283 Broadway, NEW YORK.

Self-Measuring Oil Tank!

Patented Oct. 23d, 1877.



Economy, Convenience and Cleanliness
Combined.

Send for circular.

Kellogg & Johnson,

Sole Manufacturers,
ELMIRA, N. Y.

AGENTS.

JENNINGS & BENTLEY, 59 Jefferson Avenue, Detroit.

A. M. GILBERT & CO., 95 Lake Street, Chicago.

" " 157 Water Street, Cleveland.

" " 116 Main Street, Cincinnati.

STAR OIL COMPANY, 215 Michigan Street, Buffalo.

J. KENDALL, SON & CO., Winona, Minn.

McKIRGAN & CO., Newark, N. J.

ANVIL & VISE COMBINED.



No. 1, 10 1/2 x 14 in. face, 4 in. jaw Vise, weight 40 lbs., \$4.50.
No. 2, 8 1/2 x 14 in. face, 3 1/2 in. " 25 " 3.50.
No. 3, 6 1/2 x 14 in. " 2 1/2 in. " 15 " 2.00.
The face of the Anvil is chilled hardened. Terms cash.
Delivered on cars at Worcester.
RICHARDSON MFG. CO., Worcester, Mass.
Liberal discount to the trade.

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets - Con-
mop and Swedes Iron, Leathers, Carpet, Lace and Cloth
Tacks: Finishing, Hungry, Trunk, Chest and Cane
Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

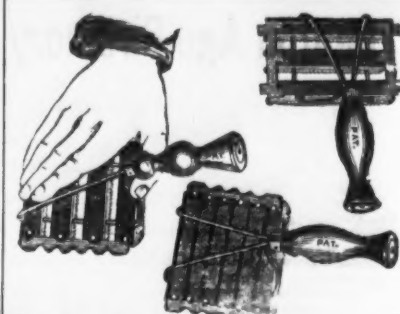
George O. Grundy,
HARDWARE,
165 Greenwich Street.

Agents for the Philadelphia Star Carriage and Tire Bolts.

70 CHARCOAL.

BUSHELS OF CHARCOAL together
with a net profit of
per cord of wood, can be made by using
Jean A. Mathieu Patent Furnace.
Address **JEAN A. MATHIEU,**
care Vaillant, 15 S. Seventh Street,
Room 2, PHILADELPHIA, PA.

\$7



The Perfect Comb.

We call your attention specially to our new patent end-
less wire frame comb. The result of a long series of ex-
periments, made with a view to meeting all the require-
ments of a Perfect Comb. It is better, stronger, and
more durable than any ever before invented. The raised
wire shank gives what has never before been attained,
viz: a rest and brace for the thumb, in such a position
that the hand cannot come in contact with the horse
while using the comb. The wire braces which run from
the shank over the back to the front teeth give strength
and durability in a direction never heretofore attained,
and at the same time serve as an extra handle; and
when clamped by the fingers in connection with the raised
shank the comb is more firmly, easily, and completely
held, and with much less fatigue to the hand than is
possible in any other form—In short, it needs but a
trial to vindicate its name: The Perfect Comb.

THE LAWRENCE COMB CO.

Factory and Office.

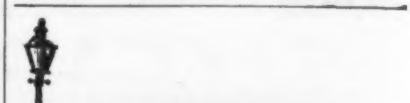
393 3d Ave., cor. 32d St., N. Y.

WM. S. CARR & CO.

Sole Manufacturers of
CARR'S
PATENT
Water
Closets,



PUMPS, CABINET WOOD WORK, &c.
106, 108 & 110 Centre Street,
Factory, Mott Haven, N. Y.



R. D. WOOD & CO.,
Philadelphia,
Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.
400 CHESTNUT STREET.

CORN SHELLERS

FOR
Home and Export Trade.

PRICES REDUCED ON ALL STYLES.

Before placing your orders send for illustrated
lists with discounts.

H. N. HUBBARD,
MANUFACTURER.

No. 393 East Twenty-Second St., New York.

WM. ESTERBROOK,

Wholesale Manufacturer of
Coal Hods

FIRE SHOVELS, Etc.

311 Cherry St., PHILADELPHIA.



Porcelain, Nickel-Plated and Bronze Whistles.

Plain or with indicators,

Speaking Pipe,
Bell Tubing,
Levers, Slides, &c.

NIGHT LATCHES.

Composition and
Brass Blanks.

FRANCIS MANY,

143 Chambers St., New York.

BOILERS, ENGINES AND TANKS FOR SALE
at **LESLIE BOILER WORKS** Pearl, near Greene
St., Jersey City. Repairs promptly attended.

Henry Disston & Sons,



KEYSTONE SAW, TOOL, STEEL AND FILE WORKS,

Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia.

Branch House, Randolph & Market Streets, Chicago, Ill.

GOLD MEDAL.

AT THE EXPOSITION UNIVERSELLE,
Paris, 1878,

In competition with the world, the highest prize and only GOLD MEDAL given for

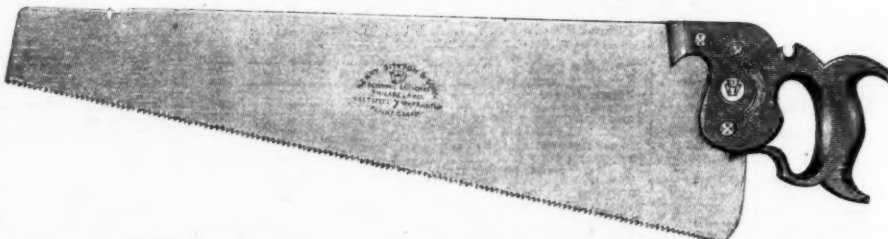
SAWS.

was awarded to

HENRY DISSTON & SONS, Philadelphia.

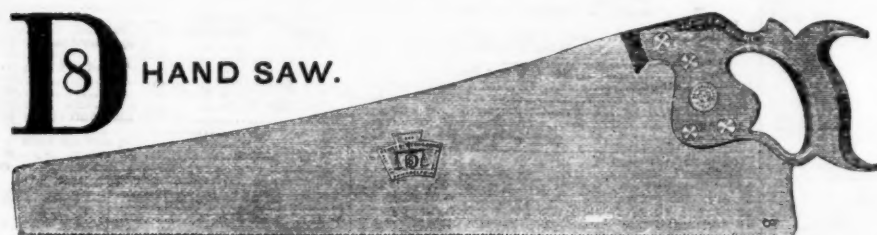


This cut represents the justly celebrated No. 7 Hand Saw, which was mainly instrumental in securing the wide reputation for Disston's Saws. It is the cheapest Saw upon which we put our own name, and none but the most skilled workmen take part in its

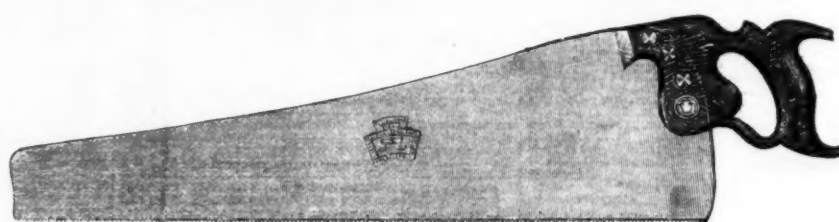


manufacture. Our hold upon the trade depends chiefly upon maintaining the high standard of this Saw, which we are determined to do. Every Saw of this brand is fully warranted.

NO. 7 DISSTON & SONS' CAST-STEEL WARRANTED, BEECH HANDLE.



8 HAND SAW.

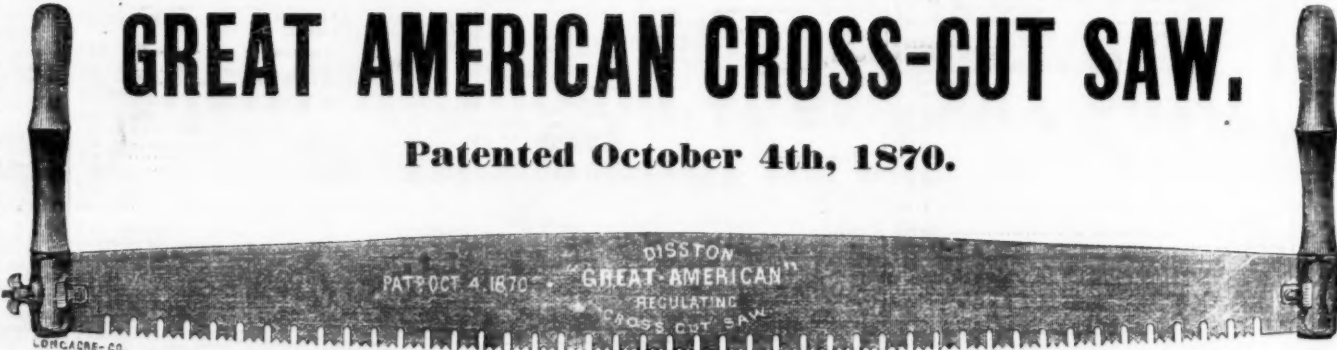


CENTENNIAL, No. 76.

Particular care is taken in the manufacture of these Saws. They are made of the finest quality of steel, of uniform and high temper, ground gradually tapering from the teeth to the back, and are set and sharpened in the most perfect manner. Each Saw is highly finished and

GREAT AMERICAN CROSS-CUT SAW.

Patented October 4th, 1870.



nicely etched, and guaranteed in every respect. The demand for this Saw has been and is constantly increasing, the number sold in the last year reaching over fourteen thousand.

This cut also represents our Improved Patented Cross-Cut Handles attached to the Saw.

GREAT AMERICAN ONE-MAN CROSS-CUT SAW.



This Saw is manufactured under the same patent, and is as highly finished and fully warranted as the regular Great American Cross-Cut Saw, but is ground on the same principle as our extra quality hand Saws.

We have lately improved the Files for keeping the teeth of the Great American Saws in order. Parties ordering Saws would find it to their benefit to order a few of these files, for it is almost impossible to get the teeth out of order if the Great American File is used.

New York Wholesale Prices, December 11, 1878.

HARDWARE.

[illegible]

Union Mfg. Co.'s Fancy Butte.....	dis 62 1/2	5
Union Finish, Plain.....	dis 62 1/2	5
..... with Iron Acorns.....	dis 75 1/2	5
..... with 1/2 Iron Acorns.....	dis 70 1/2	5
..... WITHOUT IRON.....	dis 62 1/2	5
West Joint Narrow.....	dis 40 1/2	5
..... J. J. Narrow.....	dis 34 1/2	5
..... L. S. Barton.....	dis 54 1/2	5
..... Loose Joint.....	dis 40 1/2	5
Double Butte, Back Flaps &c.....	dis 54 1/2	5
..... Double Flaps.....	dis 54 1/2	5
..... Light.....	dis 40 1/2	5
Loose Pin, Wrt.....	dis 40 1/2	5
American Spiral Spring Butt Co., Jap'd.....	dis 25 1/2	5
Sabin Mfg. Co.'s Double Acting.....	dis 10 1/2	5
Centennial, Japanned.....	dis 25 1/2	5
..... Ornamental.....	dis 10 1/2	5
Union Spring Hinge Co.'s.....	dis 25 1/2	5
American Spring Hinge Co.'s.....	dis 25 1/2	5
Union Mfg. Co.....	dis 25 1/2	5
..... Palmer.....	dis 40 1/2	5
..... Seymour.....	dis 40 1/2	5
..... Leonard.....	dis 70 1/2	5
..... Lull & Porter.....	dis 60 1/2	5
..... Nicholson.....	dis 40 1/2	5
..... H. W. F. & Co.....	dis 40 1/2	5
..... Clark's, Nos. 1, 3, 4, 40 and 45.....	dis 40 1/2	5
..... "Non-Resist".....	dis 75 1/2	5
..... "Patent".....	dis 75 1/2	5
Butchers' Cleavers.....	dis 20 1/2	5
Humason & Beckley Mfg. Co.....	dis 20 1/2	5
..... D. R. Barton Tool Co.....	dis 20 1/2	5
..... Bradley's.....	dis 20 1/2	5
..... Beauty.....	dis 20 1/2	5
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[illegible]

Lath, Nos. 1, 2, 3.....	¶ doz 8.50	8.00	7.50
Shingles, Nos. 1, 2, 3.....	¶ doz 8.00	8.40	8.00
Hail Hatches, Nos. 1, 2, 3.....	¶ doz 8.00	8.40	8.00
Chimney Caps, Nos. 1, 2, 3.....	¶ doz 8.00	8.40	8.00
Lathing, Nos. 1, 2, 3.....	¶ doz 8.00	8.40	8.00
Broad, Nos. 2, 3, 4.....	¶ doz 11.00	10.00	14.00
Lighting.....	¶ doz \$30.00 net		
Hay Knives.			
Lighting.....	¶ doz \$30.00 net		
Hinges.			
Gate, Western.....	¶ doz \$8.25	dis 60%	5
" N. E.....	¶ doz 8.10	dis 60%	5
" N. W.....	¶ doz 8.10	dis 60%	5
" Clark's No. 1.....	¶ doz 8.00	dis 60%	5
" N. Y. State.....	¶ doz 8.25	dis 60%	5
" Common Sense.....	¶ doz 8.00	dis 60%	5
" Seymour's.....	¶ doz 8.00	dis 60%	5
" H. J. & Co.....	¶ doz 8.00	dis 60%	5
" Colled Blind Hinges.....	¶ doz 8.00	dis 60%	5
" Colled Plate.....	¶ doz 8.00	dis 60%	5
" Frought Strap and 1st doz.....	¶ doz 8.00	dis 60%	5
" Lath Hinges 1 to 10 in. 1/2" B.....	¶ doz 8.00	dis 60%	5
" Providence.....	¶ doz 8.00	dis 60%	5
" Crew Hook and Strap.....	¶ doz 8.00	dis 60%	5
" Heavy Welded Hook.....	¶ doz 8.00	dis 60%	5
" Crew Hook and Eye.....	¶ doz 8.00	dis 60%	5
Hooks.			
1st Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 2nd Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 3rd Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 4th Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 5th Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 6th Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 7th Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
" 8th Lath, Sargent's List.....	¶ doz 8.25	dis 15%	5
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[illegible]

Asphaltum. gal, 50
Benzine. gal, 50
Chalk. 50
Dryer, Patent, Am'n. 50
Prostige. 50
" Sheet. 50
Glaziers' Points, Zinc. 50
" Damar. 50
" Shellac, English. 50
Litharge, English. 50
Mineral Wool. 50
Pumice Stone, powdered. 50
Putty, in bladders. 50
" in bulk. 50
Rotten Stone, soft, English. 50
Spirits Turpentine. 50
Whiting Spanish. 50

FRENCH WINDOW GLASS.
Prices current per box of 9-feet.
Single Thick.—discount 60c to 5

SIZES.	1st.	2d.	3d.	4th.
5 X 8 to 10 X 15.	7.50	6.75	6.25	5.75
11 X 14 to 10 X 24.	8.50	7.75	7.25	6.75
13 X 22 to 20 X 30.	10.75	9.75	9.25	8.75
15 X 30 to 24 X 36.	12.25	10.75	9.00	8.25
20 X 28 to 24 X 36.	13.00	11.50	9.75	9.00
20 X 37 to 26 X 44.	14.50	13.25	10.75	10.00
26 X 40 to 30 X 50.	16.00	14.50	11.25	10.50
30 X 52 to 30 X 56.	16.50	14.50	12.00	11.25
30 X 50 to 34 X 56.	17.25	15.50	13.50	12.75
34 X 52 to 34 X 56.	18.25	17.25	15.00	14.25
30 X 50 to 40 X 56.	20.75	18.75	17.25	16.25

Double Thick.—Discount 60c to 15

SIZES.	1st.	2d.	3d.	4th.
5 X 8 to 10 X 15.	12.00	11.00	10.00	9.25
11 X 14 to 10 X 24.	13.75	12.50	11.50	10.75
13 X 22 to 20 X 30.	16.75	15.25	14.50	13.75
15 X 30 to 24 X 36.	21.00	18.50	17.75	16.75
20 X 30 to 24 X 36.	23.25	21.25	19.25	18.25
20 X 40 to 30 X 40.	24.00	22.50	19.00	18.00
20 X 52 to 30 X 56.	25.75	23.25	20.25	19.25
30 X 50 to 34 X 56.	27.75	25.50	21.75	20.75
34 X 52 to 34 X 56.	29.25	27.75	24.00	23.00
30 X 50 to 40 X 56.	33.25	30.00	27.75	26.75

Sizes above 40 X 50—\$10.00 per box extra for every five inches.
 An additional 10 per cent. will be charged for glass more than 30 inches wide. All sizes above 5 inches in length, and not making more than 81 united inches, will be charged in the united inches trucked.

BRIDGE & CO.,
 Street, New York.



in. in. Plates. **Shears for Plates and Bars.**

and Power
PUNCHING PRESSES
 Steel, adapted to all trades.

Sidney Shepard & Co.
 PROPRIETORS OF THE
BUFFALO STAMPING
WORKS.
 MANUFACTURERS OF
Stamped & Japanese
TIN WARE.

Retained Ware, Plain Pieced Tin Ware,
Bathing Apparatus, Toilet Ware, Tin
Tops, Spoons, Flesh Forks, Cake Turners,
Coal and Fire Shovels, Pokers, Fry Pans,
Stove Skillets, Coal Hods, Coal Vase,
Water Coolers and Filters, Harness O
Cans, Soldering Coppers.

"Iron Clad" & "Double Rim" Stov
Boards, "Palace" Coal Vases,
"Champion" Ice Cream
Freezers,
"Novelty" and "Elevated Swinging
Transportation Cans.

PERFORATED SHEET IRON FOR PAPER MAN
FACTURERS AND MALT KILNS.

Grocers', Druggists' and Spice Mills' Tin Wa
A SPECIALTY.

Also large line of
MISCELLANEOUS HOUSE FURNISHING HARDWARE
 Send for Illustrated Catalogue. Address
SIDNEY SHEPARD & CO.
 Buffalo, N. Y. Chicago, Ill.

LEY WORKS,
Butts, Hinges,
BELTS,
Bronzed and Plated.
 to furnish all kinds of
 both Common and Bright Finish.
WAREHOUSE:
79 Chambers St., New York

Steel.

R. H. WOLFF & CO.,

IMPORTERS OF
IRON AND STEEL.

Sole Agents for the Sale of the Celebrated
**Pr. HOMOGENEOUS DEC.' CAST STEEL, GUN BAR-
RELS, MOULDS AND ORDNANCE.**

Sole Agents for **COCKER BROTHERS, Limited,**
Successors to **SAML. COCKER & SON, (ESTABLISHED 1752.)**
SHEFFIELD, ENGLAND.

Sole manufacturers of
'SC' EXTRA' Cast Steel,
AND
CAST STEEL WIRE for all purposes.
Sole Makers of

Cocker's "Meteor" Wire Plates.
Railroad Supplies and General Merchants.

Office and Warehouse. 46 Cliff Street, New York.

F. W. MOSS,

Successor to **JOSHUA MOSS & GAMBLE BROS.**

FRANKLIN WORKS, WADSWORTH BRIDGE WORKS, WALKER WORKS, **SHEFFIELD, ENGLAND.**

STEEL AND FILES.

Principal Depot, 80 John Street, New York.

MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,
Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, ING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of **MACHINISTS' TOOLS.**
Celebrated Improved Mild Centre Cast Steel for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel.

Sheet, Cast Steel, Shear, German, Round Machinery, Hammer, Fork and Shoe Steel.
GENERAL MERCHANT.

CRESCENT STEEL WORKS

MILLER, METCALF & PARKIN,
Pittsburgh, Pa.,

Manufacture the Favorite Brands of

**Crescent, Crescent Extra, Crescent Special
TOOL STEEL.**

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in quality, finish and accuracy.

Bright Cold Rolled Strips to No. 36, Fine Hot Rolled Sheets to No. 30.

Cast, Spring and Machinery Steel. Common Steel, all grades.

OFFICES: 81 Wood St., Pittsburgh; 40 Dearborn St., Chicago; 720 N. 2d St., St. Louis.

REPRESENTED IN THE MIDDLE STATES AND NEW ENGLAND BY

ELY & WILLIAMS, 1232 Market Street, Philadelphia.
114 John Street, New York.

Established 1810.

J. & RILEY CARR,
SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated

"DOG BRAND" FILES.

Also of Superior

STEEL

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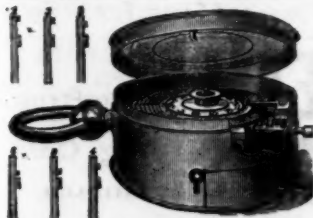
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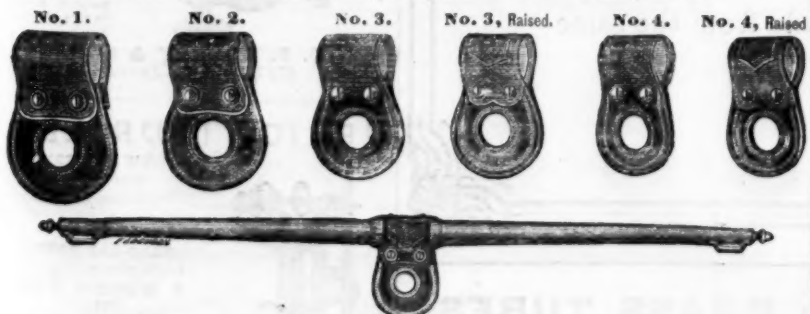
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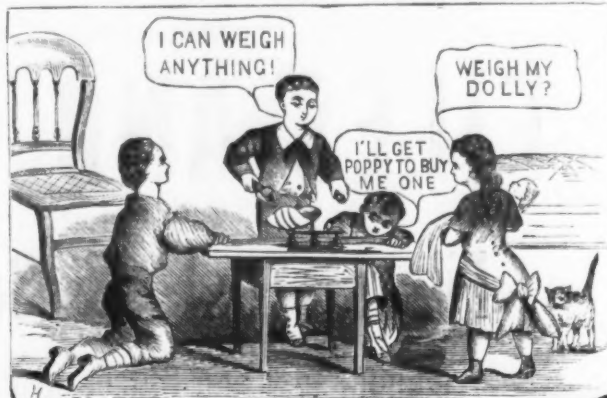
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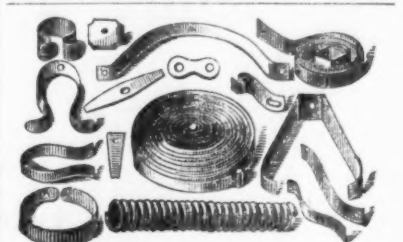
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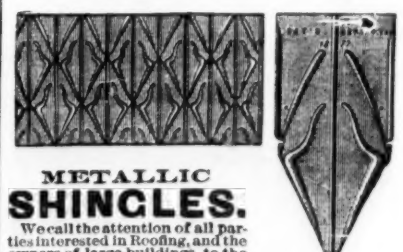
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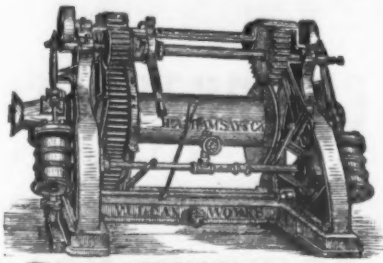
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Are made considerably lighter, but in every other respect like the ordinary hand-saw file; the lengths range from 4 to 12 inches (by inches only), being made from the sizes of three-square sections stated below.

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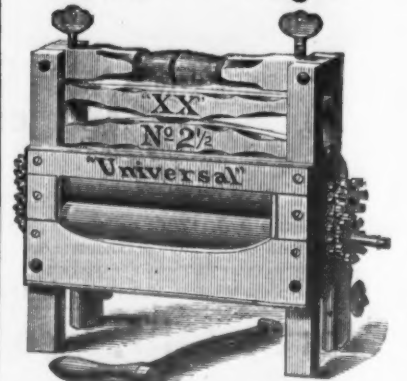
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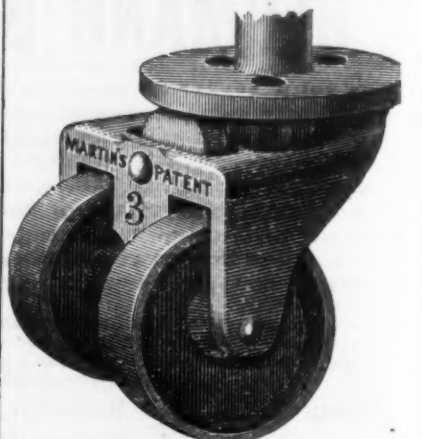
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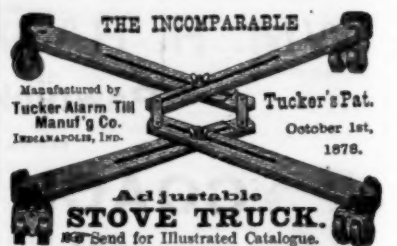
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Tucker's Patent
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STOVE TRUCK.
Send for Illustrated Catalogue.

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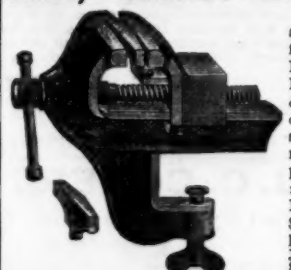
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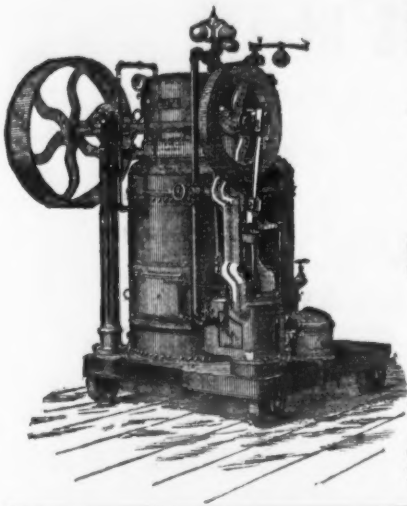
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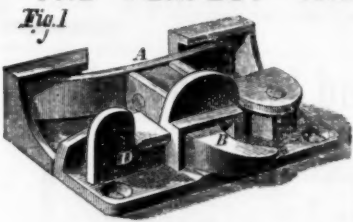
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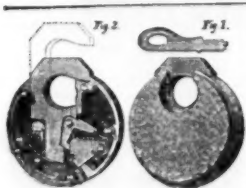
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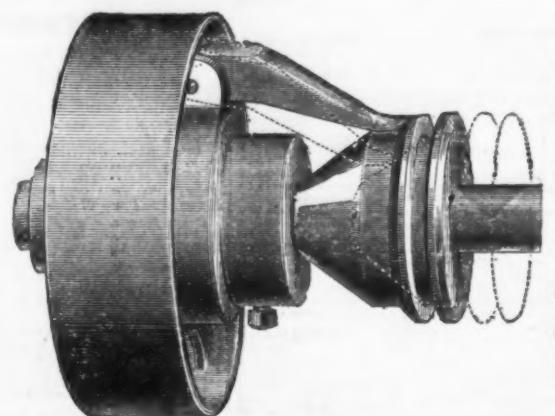
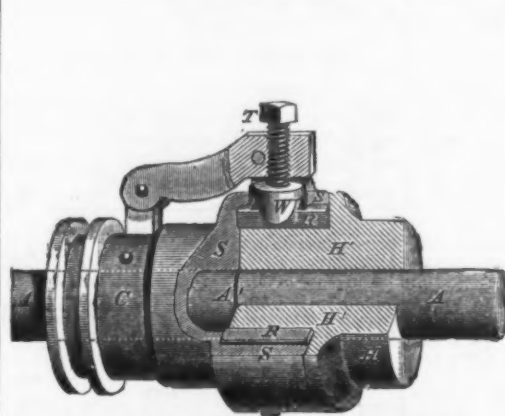
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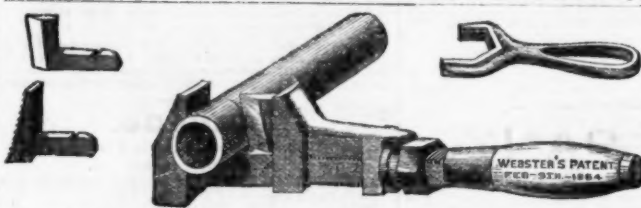
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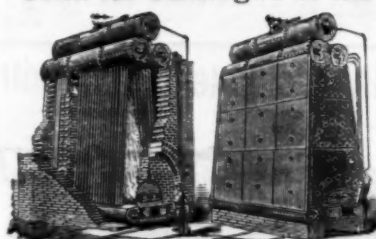
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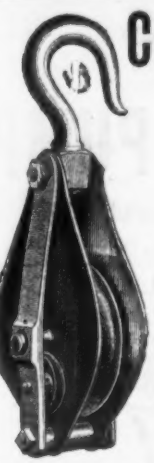
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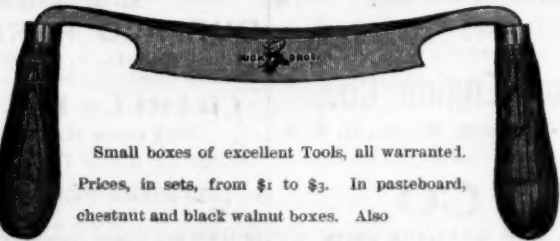
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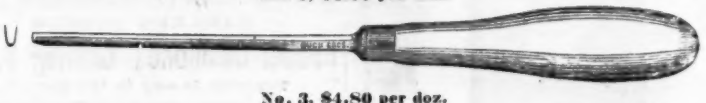


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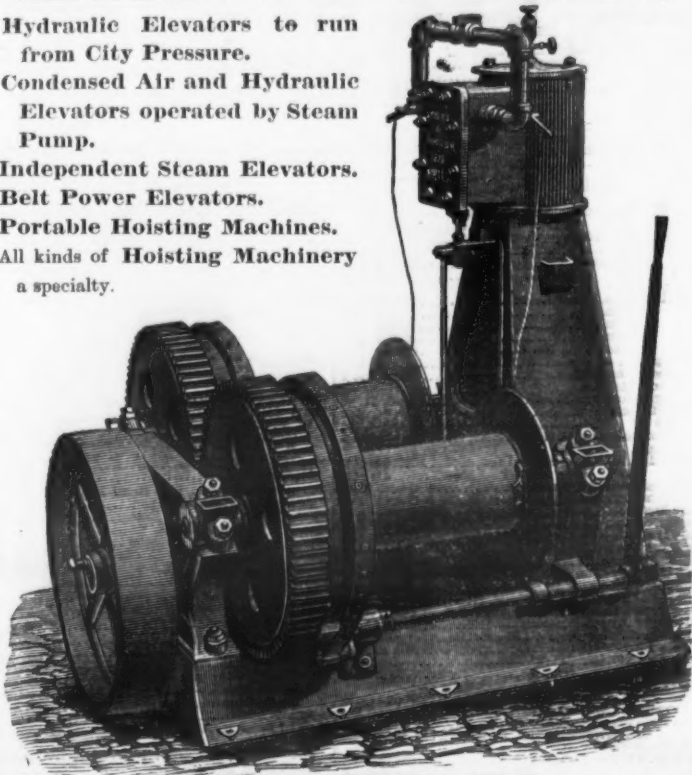
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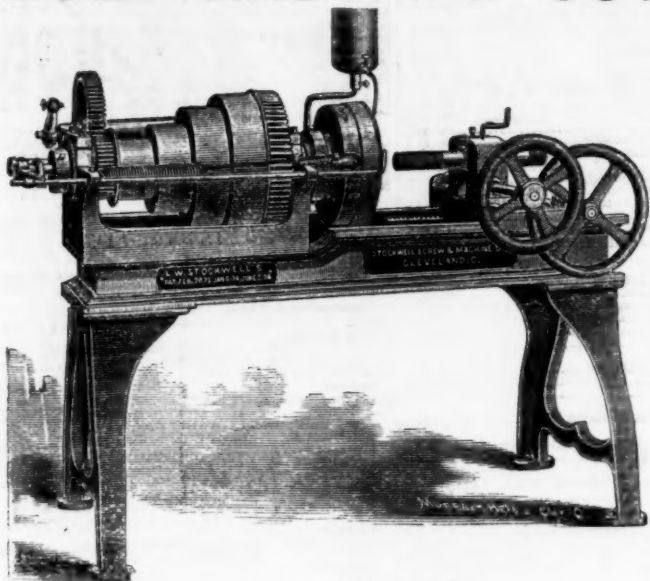
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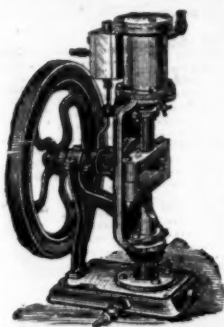
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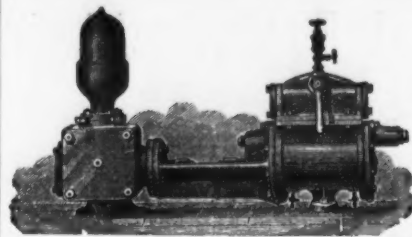
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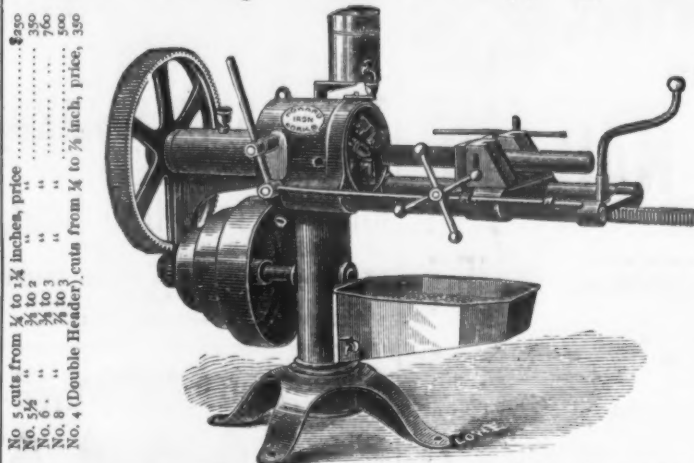
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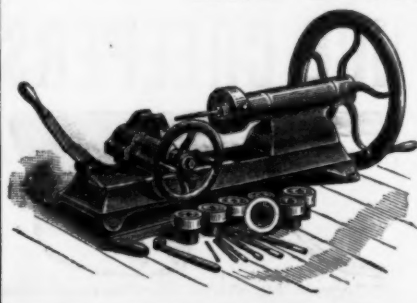
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This engraving represents a No. 5 1/2 Machine, and cuts from 3/8 to 2 inches.

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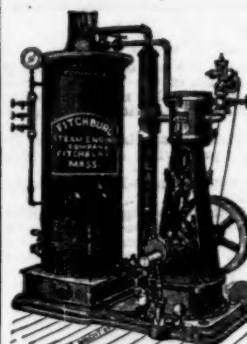
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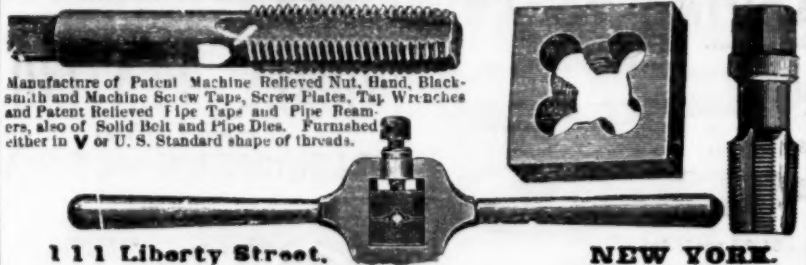
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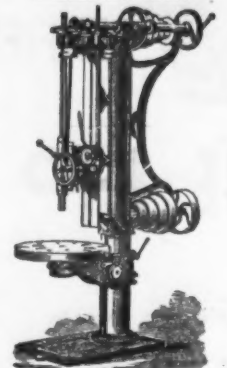
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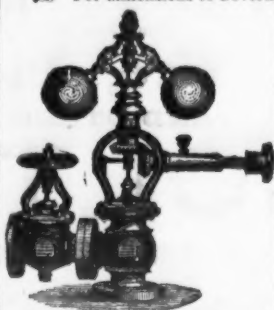
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3	30.00	37.00	3.25
3 1/4	35.00	41.00	3.50
3 1/2	40.00	46.00	3.75
3 3/4	45.00	52.00	4.25
4	54.00	62.00	4.50
4 1/4	64.00	73.00	5.00
4 1/2	74.00	84.00	5.50
4 3/4	84.00	95.00	6.00
5	97.00	109.00	6.50
5 1/4	112.00	125.00	7.00
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5 3/4	150.00	176.00	9.00
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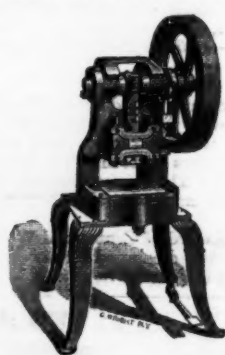
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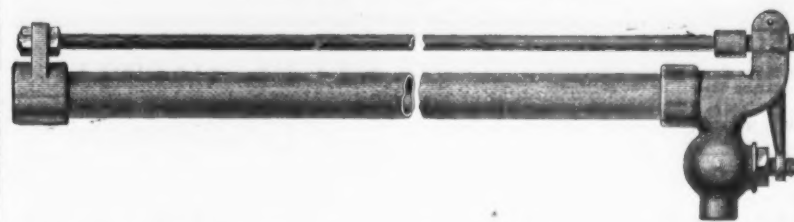
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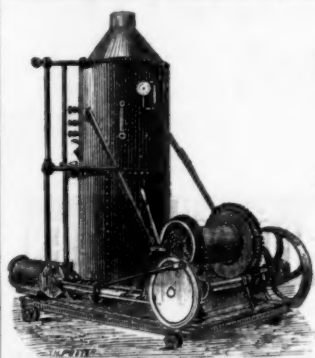
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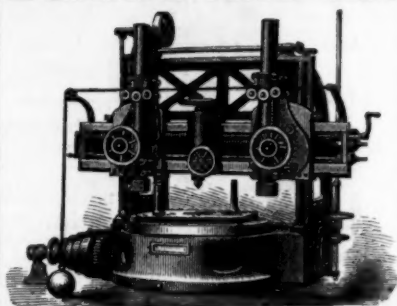
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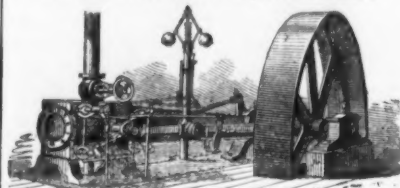
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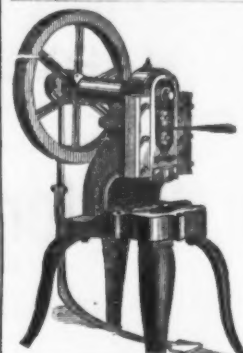
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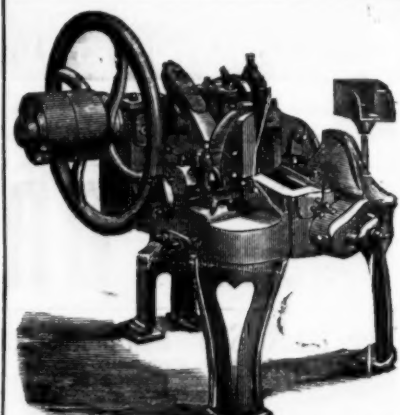
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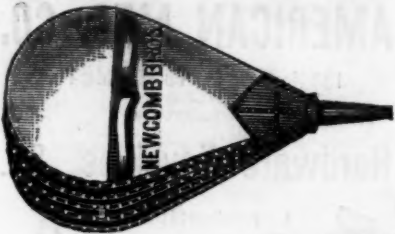
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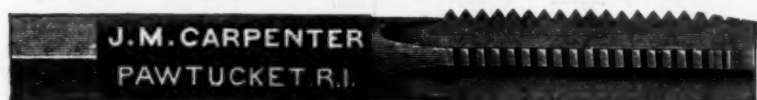
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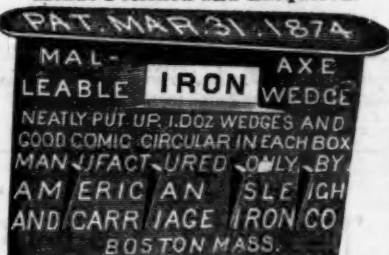
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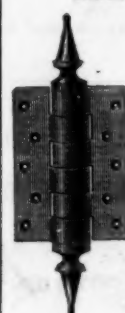
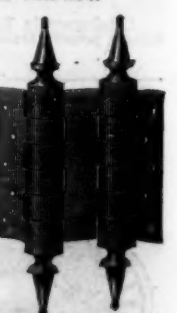
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